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Summary

GENETIC LOCI OF THE SCREW-WORM FLY
(Laboratory Strains Only)

December, 1973

TYPE	LOCUS	NAME	ADULTS	LARVAE	NO. ALLELES
<u>Protein</u>					
	P	Protein A	+	?	1
<u>Hydrolases and Lyases</u>					
	Amy	Amylase	+	+	2
	ACPH	Acid phosphate	+	0	1
	ALD-A	Aldolase-A	+	+	1
	ALD-B	Aldolase-B	0	+	1
	ALD-C	Aldolase-C	0	+	1
	APH-A	Alkaline phosphatase-A	+	+	1
	APH-B	Alkaline phosphatase-B	+	+	1
	β EST-A	β Esterase-A	+	0	4+
	α EST-B	α Esterase-B	+	0	2
	EST-C	Esterase-C	0	+	2+
	EST-D	Esterase-D	0	+	3+
	LAP-A	Leucine amino peptidase-A	0	+	1
	LAP-B	Leucine amino peptidase-B	+	+	2(?)
<u>Dehydrogenases</u>					
	ADH-A (HDH)	Alcohol dehydrogenase-A	+	+	1
	ADH-B (HDH)	Alcohol dehydrogenase-B	+	+	1
	α -GPD	α -Glycerophosphate	+	?	3
	IDH	Isocitrate dehydrogenase	+	+	1
	LDH	Lactate dehydrogenase			
	MDH-D	Malate dehydrogenase DPN dependent	+	?	1
	MDH-TA	Malate dehydrogenase TPN dependent-A	0	+	1
	MDA-TB	Malate dehydrogenase TPN dependent-B	+	+	1
	6-PGD	6-Phosphogluconic dehydrogenase	+	+	1
	G6PD	Glucose-6-phosphate	+	+	1
	SORB	Sorbital dehydrogenase	0	?	
	GDH	Glutamate dehydrogenase	+	?	1
	G3PD	Glyceraldehyde-3-phosphate	+	0	1
	GaldH	Galactose dehydrogenase	0	?	?
	Pep	Pepsinogen			

GENETIC LOCI OF THE SCREW-WORM FLY
(Laboratory Strains Only)

TYPE	LOCUS	NAME	ADULTS	LARVAE	NO. ALLELES
<u>Dehydrogenase Coupled Enzymes</u>					
	AK	Adenlate kinase	+	?	?
	Hex	Hexokinase	+	0	1
	PGI-A	Phosphoglucose isomerase-A	+	+	1
	PGI-B	Phosphoglucose isomerase-B	0	+	?
	PGM	Phosphoglucose mutase	+	+	3
	FUM	Fumarase	+	+	1
<u>Miscellaneous Enzymes</u>					
	GOT-A	Glutamate-oxaloacetate transaminase-A	0	+	1
	GOT-B	Glutamate-oxaloacetate transaminase-B	+	+	1
	GOT-C	Glutamate-oxaloacetate transaminase-C	0	+	2(?)
	Tyr	Tyrosinase	1 or 0	?	1
	AO	Aldehyde oxidase	+	0	1
	TO	Tetrazolium oxidase	+	0	1

Total number of loci examined = 36

Polymorphic in adults = 21.4% (6/28)

Polymorphic in larvae = 25% (6/24)

Polymorphic - all loci = 25% (9/36)

Preliminary isoenzyme analysis conducted by:

Dr. Guy L. Bush
Associate Professor of Zoology
Department of Zoology
University of Texas
Austin, Texas 78712

The eight polymorphic loci listed below are available for routine analysis when both larvae and adults are run from each population sampled.

	a-GDH	EST-A	EST-B	EST-C	AMY-A	PGM-A	ALD-A	GOT-A
Adults	+	+	+		+	+		
Larvae	+			+	+	+	+	+

Estimates of Genetic Variation at Five Loci in Two Mass-reared Adult Populations of the Screw-worm Fly

ESTERASE-A				
<u>Strain</u>	<u>n</u>	<u>Alleles</u>		
		<u>1</u>	<u>2</u>	<u>3</u>
Tex-Mex	43	.605	.186	.209
APHIS	44	.716	.011	.250

ESTERASE-B					
<u>Strain</u>	<u>n</u>	<u>Alleles</u>			
		<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Tex-Mex	34	.441	.147	.118	.294
APHIS	35	.371	.129	.114	.386

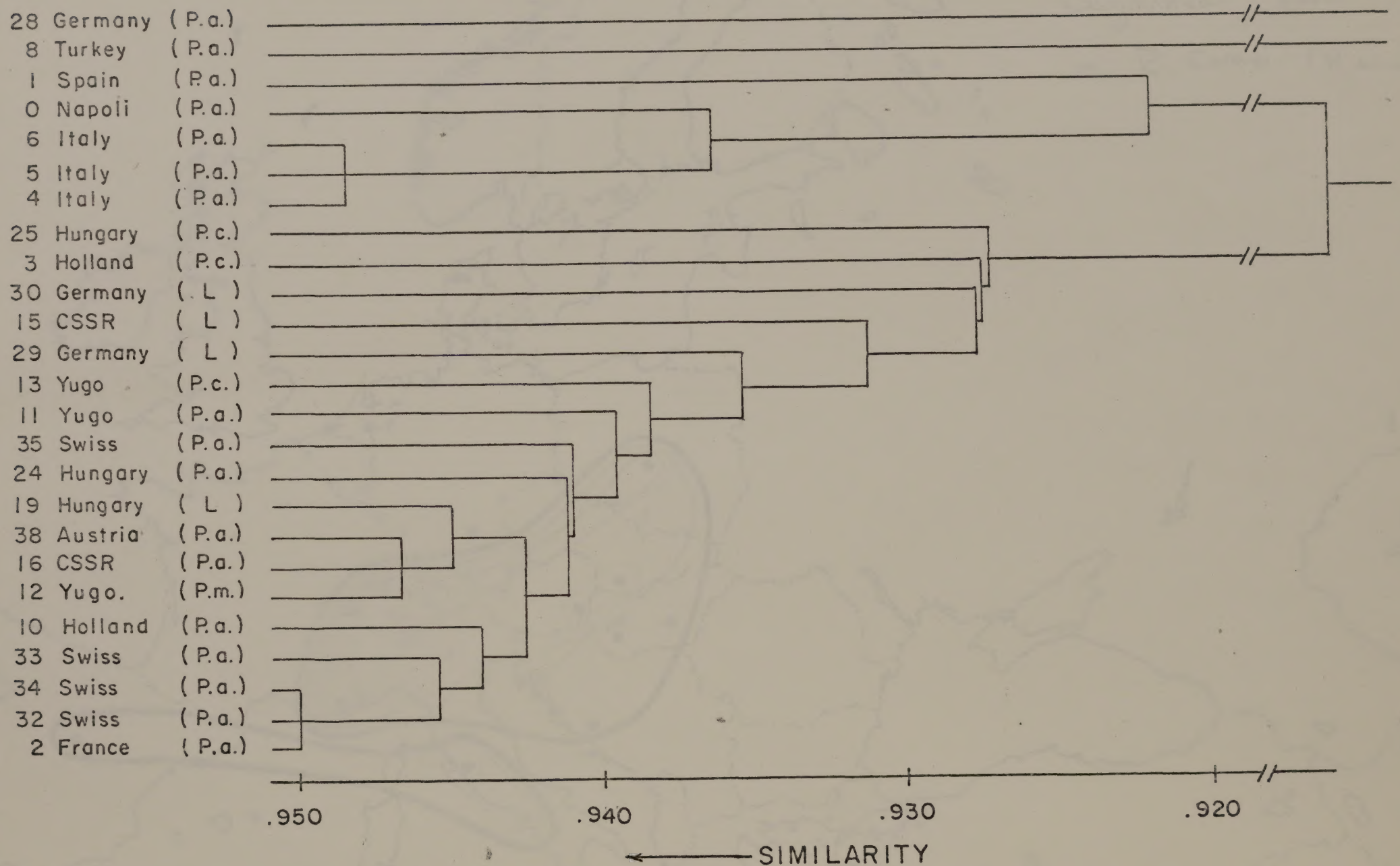
α -GLYCEROPHOSPHATE-A			
<u>Strain</u>	<u>n</u>	<u>Alleles</u>	
		<u>1</u>	<u>2</u>
Tex-Mex	43	.930	.070
APHIS	43	.872	.128

PHOSPHOGLUCOSE MUTASE-A				
<u>Strain</u>	<u>n</u>	<u>Alleles</u>		
		<u>1</u>	<u>2</u>	<u>3</u>
Tex-Mex	43	0	1.000	0
APHIS	43	0	1.000	0

AMYLASE-A			
<u>Strain</u>	<u>n</u>	<u>Alleles</u>	
		<u>1</u>	<u>2</u>
Tex-Mex	43	0	1.000
APHIS	43	0	1.000

CLUSTERING RESULTS

26 *R. cerasi* Populations



Geographical Variation
in *R. Corasi* (*P. avium*)



Bill,

7/2/74

IN May, 1974 I called Perry ATKINSON since I was new to Texas and wanted to discuss our and Texas A & M involvement with the Seaworms.

In our discussions the need for attractant work as well as General Behavior studies was mentioned. ~~He~~ The point came out that he had a good man in this area - that would be available for Seaworm research if funds could be provided. While Texas A & M has not had a direct value with SW in the past recent problems with the program have made them interested.

During Late June Perry and I (at college station) discussed the situation and decided that it would be beneficial to both the USDO & Texas A & M

RECEIVED

JUL 3 1974

AREA OFFICE
WESLACO, TEXAS



To place DV FRANK, Gille 17
on the program in a cooperative
relationship. on July 1, DV
Schwiesow was informed and
action was initiated.

Just



SUBTROPICAL TEXAS AREA
P. O. Box 267
Weslaco, Texas 78596

May 22, 1974

Subject: Screwworm Laboratory Program, Mission

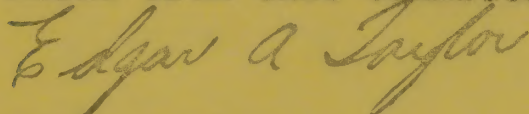
To: A. W. Cooper, Deputy Administrator
Southern Region, ARS - USDA
New Orleans, La.

The attached report on the Mission Laboratory Program was prepared in response to H. C. Cox's request of March 28. J. L. Goodenough's slot and salary transfer to the Screwworm Research Program is urgently needed to support the APHIS release program.

Since most of the engineering research will involve program fly production activities, APHIS will have a substantial support input, otherwise the \$65,000/SMY would be inadequate. In fact, all of the screwworm research involves costly field evaluations, TDY assignments in Mexico, and mass production of newly developed strains for APHIS production which requires maximum support/SMY.

The screwworm situation in Texas is not good. As of today, more than 600 cases have been identified (4 times the number for the same date in 1973) and the distribution is quite similar to the 1972 outbreak. This could be another disastrous (1972) year.

A Special Congressional Investigations Committee, headed by W. Eden of Florida and C. Lincoln of Arkansas, has made a preliminary review at Mission and we do not anticipate a favorable report for ARS or APHIS. The final report will be completed by August 15. This committee was funded by a \$100,000 rider to the APHIS supplemental screwworm appropriation. I believe the ARS reorganization can gain some good marks from this committee.



E. A. Taylor
Area Director

Enclosure

ARS:SR:EATaylor:je 5/22/74

ANTHROPOLOGICAL RESEARCH
UNIT
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20246

MAY 22 1974

Subject: Antelope Island, Utah

Mr. W. Cooper, Deputy Administrator
Southern Region, ARS - USDA
New Orleans, LA

The attached report on the Antelope Island Research Station was prepared in response to Mr. C. Cox's request of March 22, 1974. The report's title and salary schedule for the research station program is urgently needed to support the ATIS research program.

Since most of the antelope research will involve programmatic and management activities, ATIS will have a substantial support budget. Otherwise the \$55,000/ANM would be inadequate. In fact, all of the research research projects would be field oriented. ATIS is currently in Mexico, and was production of newly developed strains for ATIS research. ATIS requires maximum support/ANM.

The antelope situation in Texas is not good. As of today more than 600 cases have been identified (4-11-74) and the number for the same date in 1973) and the distribution is similar to the 1973 outbreak. This could be another disastrous (1973) year.

A Special Congressional Investigations Committee, headed by W. Egan of Florida and C. Simpson of Arkansas, has made a preliminary review of ATIS and is to be completed by August 1. This committee was formed by the House of Representatives. This committee's report will be submitted to the House of Representatives. I believe the ATIS situation is very serious and the ATIS situation is very serious.

W. A. Taylor
Acting Director

ARS:SR:RATaylor:je 5/22/74

A. H. Cooper

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHERN REGION

Screwworm Research Laboratory
P. O. Box 986
Mission, Texas 78572

May 15, 1974

Subject: Mission Laboratory Program

To: E. A. Taylor, Area Director
Subtropical Texas Area

Below are listed SMY's for Mission including the three new positions and \$202,000 before Congress:

Currently on Board

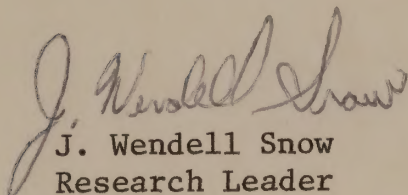
Scientist	Research Effort	Support Cost
J. W. Snow	Research Leader	\$ 65,000
B. G. Hightower	Ecology	65,000
M. M. Crystal	Physiology	65,000
C. M. Jones	Attractants	65,000
H. E. Brown	Nutrition	65,000
J. L. Goodenough		
(Reporting June 15)	Engineering	65,000
TOTAL	6 SMY	\$390,000

Proposed Increase

Vacancy	Rearing	\$ 65,000
Vacancy	Genetist	65,000
Vacancy	Physiologist	65,000
TOTAL	3 SMY	\$195,000

Location support planned for FY 1975 is \$291,700 based on monies appropriated in past years. The anticipated increase of \$202,000 will provide a total of \$493,700. As shown above, our needs based on a support cost of \$65,000/SMY is \$585,000 (a deficit of \$91,300). The fund situation will be inadequate to properly support the above proposed program even if the \$202,000 increase materializes. The situation will be extremely critical if the new program is not approved and we must operate on the base funds of \$291,700.

In summary, Dr. Goodenough and the proposed vacancies are necessary additions to complete our research team. An engineer has been a vital need for a long time. However, since an engineer has not been present, the initial costs to provide a shop, tools, and equipment will be high. I sincerely hope that Dr. Cooper will consent to both position and funds for Mission.

A handwritten signature in cursive script, reading "J. Wendell Snow".

J. Wendell Snow
Research Leader

revised *File*

EAT
WFS
JE
NC

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

SOUTHERN REGION
Screwworm Research Laboratory
P. O. Box 986
Mission, Texas 78572

May 10, 1974

Subject: Mission Laboratory Program

To: E. A. Taylor, Area Director
Subtropical Texas Area

Below are listed SMY's for Mission including the 3 new positions and \$202,000 before Congress:

Currently on Board

Scientist	Research Effort	Support Cost
J. W. Snow	Research Leader	\$ 65,000
B. G. Hightower	Ecology	65,000
M. M. Crystal	Physiology	65,000
C. M. Jones	Attractants	65,000
H. E. Brown	Nutrition	65,000
TOTAL	5 SMY	<u>\$325,000</u>

Proposed Increase

Vacancy	Rearing	\$ 65,000
Vacancy	Genetist	65,000
Vacancy	Physiologist	65,000
Total	3 SMY	<u>\$195,000</u>

Our current location support is \$282,200 which brings the total to \$484,200 providing the \$202,000 increase is approved. As shown above, our needs based on the support cost of \$65,000/SMY is \$520,000 (a deficit of \$35,800). The fund situation becomes more acute if Dr. Goodenough's salary is lost. However, the situation will be more critical if the new program is not approved and we operate on base funds (\$282,200).

In summary, Dr. Goodenough is a necessary addition to complete our research team. An engineer has been a vital need for a long time. However, since an engineer has not been present, the initial costs to provide a shop, tools, and equipment will be high. I sincerely hope that Dr. Cooper will consent to both position and funds for Mission.

J. Wendell Snow
J. Wendell Snow
Research Leader

RECEIVED

MAY 14 1974

AREA OFFICE
WESLACO, TEXAS

SUBTROPICAL TEXAS AREA
P. O. Box 267
Weslaco, Texas 78596

July 26, 1974

Subject: Transfer - C. J. Whitten, College Station
to Mission, Texas

To: A. W. Cooper, Deputy Administrator
Southern Region, ARS-USDA
New Orleans, LA

During our trip to Mexico following the Executive Review of the Screwworm Research Program, we discussed the need for an additional scientist at Mission to supervise the incorporation of genetic material to the factory strain and develop procedures to provide factory production while retaining good mating competitiveness in the environment. Both O. H. Graham and R. C. Bushland suggested D. North of Fargo, North Dakota, as the best candidate for this assignment. After several conversations with D. North, he indicated a very high interest in the work but he has declined for personal reasons.

In further search of ARS rolls, J. W. Snow has located an ARS scientist, C. J. Whitten, at College Station who fits our needs for a physiologist-production scientist. He completes his PhD in August and has expressed a desire to transfer to Mission. His current Research Leader, R. L. Ridgway, while pleased with his performance, agrees that a transfer would be mutually beneficial to ARS and C. J. Whitten. All of his college training has been at Texas A&M. He has expertise in genetics, isoenzyme techniques, insect rearing, and biochemistry that fits our needs for a scientist to develop competitive factory strains and investigate the possibility of isolated environmental biotypes that may occur in southern Mexico.

We will be able to meet the Subtropical Texas Area's permanent personnel ceiling of 136 with the transfer of C. J. Whitten to Mission. On July 15, 1974, there were 141 PFT positions

CONFIDENTIAL
U.S. GOVERNMENT
OFFICE OF THE DIRECTOR
FEDERAL BUREAU OF INVESTIGATION

MEMORANDUM FOR THE DIRECTOR
SUBJECT: [Illegible]

TO: [Illegible]
FROM: [Illegible]
DATE: [Illegible]

[Illegible text block]

[Illegible text block]

[Illegible text block]

2.

on the STA rolls. The following actions have been initiated and/or anticipated during the next six months.

July 15, 1974 - PFT in STA ----- 141

<u>Location</u>	<u>Personnel action</u>	<u>No. Positions</u>
Weslaco	Term appointments expire 10/28/74	2
"	Horticulturist on foreign assignment, Aug. 1974	1
"	Disability retirement, LWOP 6/30/74	1
Mission	Entomologist transfer to APHIS, Aug. 1974	1
"	Retirement of Entomologist, January 1975	1
Total Positions		- 6

January, 1975 - PFT in STA ----- 135

The above proposed action concerning C. J. Whitten will satisfy our current scientific manpower needs for the screwworm research program at the present level of funding. This matter has been discussed informally with J. R. Johnston and it has his concurrence. Therefore we request approval to fill the above vacancy at Mission created by the entomologist transferring to APHIS in August.

E. A. Taylor

E. A. Taylor
Area Director

cc:

R. L. Ridgway
J. R. Johnston
J. W. Snow

ARS:SR:EATaylor:je 7/26/74

J. W. Snow
J. R. Johnston
R. L. Ridgway

Area Director
E. A. Taylor

E. A. Taylor

The above proposed action concerning C. J. Whitten will satisfy our current scientific manpower needs for the current research program at the present level of funding. This matter has been discussed informally with J. R. Johnston and it has his concurrence. Therefore we request approval to fill the above vacancy at Mission created by the entomologist transferring to ARHS in August.

January, 1975 - PFT in STA - 132

Total Positions		
1	Retirement of Entomologist, January 1975	
1	Entomologist transfer to ARHS, Aug. 1974	
1	Entomologist transfer to ARHS, Aug. 1974	
1	Disability retirement, 1974	
1	Assignment, Aug. 1974	
2	Term appointments expire 10/28/74	
No. Positions		

July 15, 1974 - PFT in STA - 141

on the STA rolls. The following actions have been initiated and/or anticipated during the next six months.

Sent via telecopier 8/12/74. JE

Sent via telecopier to Paul Koenig, 8/16/74 4:15 pm. JE

SUBTROPICAL TEXAS AREA
P. O. Box 267
Weslaco, Texas 78596

August 12, 1974

Subject: Analysis of Screwworm Program Support

To: A. W. Cooper, Deputy Administrator
New Orleans, LA

In response to H. C. Cox's request to J. W. Snow, the following information is being submitted.

Present support for this program is \$291,700 at the project level. This is approximately \$343,985 at appropriation level. Personnel on board at this time are J. W. Snow, B. G. Hightower, M. M. Crystal, C. M. Jones, H. E. Brown, and J. L. Goodenough. These six scientists represent 6 SMY and if supported at \$65,000 per SMY (appropriation level) require \$390,000. A deficit of \$46,015 exists if these researchers are to receive adequate support to work on a routine basis. It is therefore requested that J. L. Goodenough's salary in the amount of \$20,853 be transferred to this project. This calculates to \$24,590 with a remaining deficit of \$21,425 at the appropriation level.

SUMMARY OF FUNDS

	Project Level*	Appropriation Level
Needed	330,720	390,000
Present	291,700	343,985
Deficit for full support	39,020	46,015
J. L. Goodenough's salary	20,853	24,590
Remaining deficit	18,167	21,425

* Based on appropriation level x 0.848

SUBJECT: Analysis of Serivice Program Support
T. O. 100-107
Weslaco, Texas 78590

August 11, 1974

Subject: Analysis of Serivice Program Support
To: A. W. Cooper, Deputy Administrator
New Orleans, LA

In response to Mr. C. Lee's request to J. W. Snow, the following information is being submitted.

Present support for this program is \$281,700 at the project level. This is approximately \$343,985 at appropriation level. Personnel on board at this time are J. W. Snow, E. G. Hightower, L. M. Unstead, C. W. Jones, L. E. Brown, and J. L. Goodenough. These six accountants represent \$281,700 and is supported at \$33,000 per SW (appropriation level) totaling \$200,000. A deficit of \$45,015 exists if these researchers are to receive support as work on a routine basis. It is therefore requested that J. L. Goodenough's salary be increased to \$20,833 be transferred to this project. This calculates to \$24,300 with a remaining deficit of \$20,715 at the appropriation level.

SUMMARY OF FUNDS

Project Level	Appropriation Level
Needed	330,720
Present	281,700
Deficit for full support	49,020
J. L. Goodenough's salary	20,833
Remaining deficit	28,187

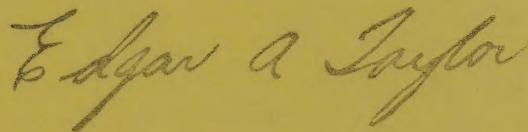
Based on appropriation level \$2,000

During August, B. G. Hightower will transfer to APHIS. C. M. Jones is scheduled to retire early in 1975. Funds presently supporting B. G. Hightower will serve as support for C. J. Whitten (Transfer from College Station). Residual funds, if any, after C. M. Jones retires, would serve as support for the total program.

New money, \$202,000 at the appropriation level, will be used to fund the General Cooperative Agreement now prepared to obtain some research on screwworm fly ecology and attractants through Texas A&M University and hire two new scientists if ceiling slots become available. If no additional scientists can be hired, the needed service will be sought through the Cooperative Agreement with Texas A&M University and Instituto Nacional de Investigaciones Agricolas and/or Monterrey Technical Institute.

In order to support the engineering and chemistry phases of the program, a building will need to be remodeled and repaired. A one-time request for \$11,000 to accomplish this was requested with the FY 1975 WRU report. The necessary shop equipment for the engineering component and glassware for the chemistry research will require considerable funds this year. Both phases will need analytical instruments that were not required under previous research efforts.

A critical part of the screwworm research program that has been lacking prior to 1973 is adequate field testing of new strains developed for APHIS before they are adopted in the program. The extremely high cost of field evaluation of these new strains was discussed at the Executive Review in January. Much of this cost has been covered by APHIS during the past two years. APHIS complained this week at the Congressional Review that this funding should come from ARS and that this diversion has caused a serious handicap to their regular methods development activities. Since this matter will be brought out in the Congressional review, the above proposal for Regional redirection of funds to screwworm research for J. L. Goodenough's salary would not only provide urgently needed funds to support the new engineering research, but would also indicate a good management response to this sensitive area under investigation.



E. A. Taylor
Area Director

During August, B. C. Highower will transfer to APHIS. C. M. Jones is scheduled to retire early in 1975. Funds presently supporting B. C. Highower will serve as support for C. J. Whitten (Transfer from College Station). Residual funds, if any, after C. M. Jones retires, would serve as support for the total program.

New money, \$202,000 at the appropriation level, will be used to fund the General Cooperative Agreement now prepared to obtain some research on screwworm fly ecology and attractants through Texas A&M University and hire two new scientists if ceiling slots become available. If no additional scientists can be hired, the needed service will be sought through the Cooperative Agreement with Texas A&M University and Institute Nacional de Investigaciones Agrícolas and/or Monterrey Technical Institute.

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E. A. Taylor

E. A. Taylor
Area Director

ARS:SR:EATaylor:nc 8/12/74

SUBTROPICAL TEXAS AREA

P. O. Box 267

Weslaco, Texas 78596

August 14, 1974

Dr. W. G. Eden
Department of Entomology & Nematology
University of Florida
3103 McCarty Hall
Gainesville, Florida 32601

Dear Dr. Eden:

I missed you and Dr. Lincoln Thursday afternoon by a few minutes. So I will take advantage of this transmittal of the final copy of projected ARS needs to provide support for the APHIS Screwworm Program to comment on the program review.

You will recall Dr. Anderson's response to your question concerning Congressional Hearings on ARS and APHIS budgets. He testified that since the ARS reorganization, these hearings are held independently of each other; whereas, prior to that, ARS and APHIS were one agency and both action and research heads were available for questioning.

I believe this response was much too simple and faults the present ARS organization out of proportion. Actually, the ARS and APHIS budgets have been developed independently since 1953. Both groups present at the budget hearings did not guarantee a balanced ARS-APHIS budget. Also, APHIS funds have been administratively prohibited for ARS use. The only exceptions to this was Under Secretary Campbell's intervention to divert \$1 million from APHIS to ARS in FY 1970 to support fire ant research.

When APHIS action programs falter or continue beyond their estimated time for completion, there may be several reasons. One major reason is lack of research and development input

8/11/74
8/11/74
8/11/74

8/11/74

Department of Health
Division of Health
Washington, D.C. 20461

I mailed you and Dr. Anderson Thursday afternoon at 4:15
minutes. So I will have about 24 hours of the material
and final copy of projected AHS needs to report to report
for the AHS research program to conduct on the program
review.

You will recall Dr. Anderson's response to your question
concerning Congressional testimony on the AHS. He
has indicated that since the AHS research program, there
has not been independent of each other, whether
to the AHS and AHS were the same, and the
researcher hands were available for questions.

I have this response was made too early in the
process. The organization was of a more local nature, the
AHS and AHS have been heavily involved in the
since 1971. Both are present at the same time, but
not necessarily in the same way. The AHS and AHS
have been heavily involved in the AHS and AHS
the only response to this is that the AHS and AHS
researcher is divided at all times from AHS and AHS
1970 to present. The response.

The AHS and AHS are both in the AHS and AHS
researcher is divided at all times from AHS and AHS
one major reason is that the AHS and AHS

2.

from beginning to completion. A solution to this problem would be an arbitrary increase in the ARS budget of 10% of the APHIS program funding, unless it can be verified by ARS or a non-federal committee that these funds are not needed.

The cost/benefit of insuring adequate research input for the screwworm program is obvious. One chemist, recently added to the screwworm research staff, has data to show that cottage cheese is not required in the diet. This item alone can save up to \$876,000 per year. Eighty percent of the larval diet protein is not used and discarded from each batch of flies. Research could probably develop clean-up and recycling procedures and further reduce the cost of production.

The many pit falls of Mexico are unknown. Therefore, the enclosed statement on research needs for the screwworm program, which includes a major thrust in Mexico, is the minimum. Funding of the cooperative effort for outside institutions in the United States and Mexico should probably match the proposed ARS in-house effort. Information on the population dynamics of the screwworm fly in Mexico should be developed as soon as possible. There is very little research effort presently underway in Mexico. The residual population of flies in Mexico and subsequent annual movement to the United States is the one big difference between the Southwest and the highly successful Southeast screwworm eradication program.

You and Dr. Lincoln conducted a very open, instructive, and thorough hearing at Mission. I thank you for the opportunity you provided for each of our scientists to testify.

Sincerely,

E. A. Taylor
Area Director

Enclosure

cc: (w/encl)
Charles Lincoln

ARS:SR:EATaylor:je 8/14/74

bc: (w/encl)
A. W. Cooper
J. W. Snow

from beginning to completion. A solution to this problem would be an arbitrary increase in the ARS budget of 10% of the ARS program funding, unless it can be verified by ARS or a non-federal committee that these funds are not needed.

The cost/benefit of insuring adequate research input for the screwworm program is obvious. One chemist, recently added to the screwworm research staff, has data to show that cottage cheese is not required in the diet. This item alone can save up to \$875,000 per year. Eighty percent of the larval diet protein is not used and discarded from each batch of flies. Research could probably develop clean-up and recycling procedures and further reduce the cost of production.

The many pit falls of Mexico are unknown. Therefore, the enclosed statement on research needs for the screwworm program, which includes a major thrust in Mexico, is the minimum. Funding of the cooperative effort for outside institutions in the United States and Mexico should probably match the proposed ARS in-house effort. Information on the population dynamics of the screwworm fly in Mexico should be developed as soon as possible. There is very little research effort presently underway in Mexico. The residual population of flies in Mexico and subsequent annual movement to the United States is the one big difference between the Southwest and the highly successful Southeast screwworm eradication program.

You and Dr. Lincoln conducted a very open, instructive, and thorough hearing at Mission. I thank you for the opportunity you provided for each of our scientists to testify.

Sincerely,

E. A. Taylor
Area Director

Enclosure

cc: (w/encl)
Charles Lincoln

ARS:SR:EATaylor:je 8/14/74

pc: (w/encl)
A. W. Cooper
J. W. Snow

See Microfilm 9/13/74
JE

To: M. DUYE (PAC) AND L. HENDERSON (NPS)

EA TAYLOR

CURRENT MISSION RESEARCH STATUS AND REQUIRED CHANGES TO MEET RESEARCH
NEEDS FOR THE EXPANDED SCREWORM ERADICATION PROGRAM

History of Program

From 1962 to 1971 (with a minor exception in 1968), the screwworm eradication program successfully controlled screwworms in the United States. During this time, the ARS Research Laboratory was established (1963) at Mission with a budget of \$200,000/year. However, support was allocated through the Kerrville Laboratory and passed to Mission based on numbers of SMY's rather than appropriated funds. During this period, professionals transferred or retired without replacement. From a maximum of 6 staff members in 1963, only 3 remained committed to screwworm research by 1972.

During 1972, the program suffered a serious setback in the southwestern states. A total of 96,625 cases were reported in Texas alone. There were undoubtedly more unreported cases. During this year, the United States signed an agreement with Mexico to extend the eradication program to the Isthmus of Tehuantepec.

During 1973, the situation was again serious in South Texas. Some ranchers reported as much as 30% loss of herds. Effective control was not obtained until late in the season. This outbreak was related to high populations of the Gulf Coast Tick that provided large numbers of wounds. In 1974 the situation through June indicates another bad year. Infestations are currently 3 times greater than 1973 and range throughout most of Texas. Gulf Coast Ticks are becoming common in South Texas.

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To: M. O'Neil (PA) and L. Henderson (NPS)

EA Taylor

CURRENT MISSION RESEARCH STATUS AND REQUESTED CHANGES TO MEET RESEARCH NEEDS FOR THE WILSONS BARNBURNER RESEARCH PROGRAM

History of Program

From 1963 to 1971 (with a minor exception in 1968), the barnburner eradication program successfully controlled barnburners in the United States. During this time, the ARS Research Laboratory was established (1963) at Mission with a budget of \$100,000/year. However, support was allocated through the Kerrville Laboratory and passed to Mission based on numbers of SN's rather than appropriated funds. During this period, professionals transferred or retired without replacement. From a maximum of 6 staff members in 1963, only 3 remained committed to barnburner research by 1971.

During 1972, the program suffered a serious setback in the south-western states. A total of 98,535 cases were reported in Texas alone. There were undoubtedly more unreported cases. During this year, the United States signed an agreement with Mexico to extend the eradication program to the isthmus of Tehuantepec.

During 1973, the situation was again serious in South Texas. Some ranchers reported as much as 30% loss of herds. Effective control was not obtained until late in the season. This outbreak was related to high populations of the Gulf Coast tick that provided large numbers of wounds. In 1974 the situation through June indicated another bad year. Infestations are currently 3 times greater than 1973 and range throughout most of Texas. Gulf Coast ticks are becoming common in South Texas.

Dr. W. Cooper
J. W. Brown

Therefore, it becomes apparent that the screwworm program has been extended to include Mexico at a time when results suggest that serious problems exist in our current program. The Agricultural Research Service recognized this after the 1972 outbreak and began restaffing the laboratory and transferring support funds. Currently, 5 SMY's are at Mission with a chemist on loan from Food Crops Utilization Research, Weslaco, Texas. The current approved budget for FY 75 is \$291,700 at project level. The additions have been made through reallocation of existing personnel and funds. The APHIS budget for Mexico and the United States will range from 16 to 20 million/year. Based on current problems and the expanded program, ARS will not be able to adequately meet the research needs of the APHIS program. A proposal is currently before Congress to increase the Mission budget by \$202,000/year (appropriation level) and provide 3 additional SMY's.

Potential Causes of Reduced Program Effectiveness

The highest research priority is the identification of the factors involved in the recent ineffectiveness of release flies. Candidate reasons are:

1. Nutrition. The factory converted to a hydroponic diet shortly before the first outbreak in 1972. This diet has been used intermittently since that time. Sufficient data are not available to establish this medium as a good substitute for meat.

2. Assortive Mating. The selection of an avoidance or recognition mechanism by wild flies over the last 12 years (resistance).

Therefore, it becomes apparent that the research program has been

extended to include Mexico at a time when results suggest that various

problems exist in our current program. The Agricultural Research Service

recognized this after the 1972 outbreak and began re-evaluating the laboratory

and transferring support funds. Currently, 2 SMY's are at Mission with a

checklist on loan from Food Crops Utilization Research, Houston, Texas. The

current approved budget for FY 75 is \$291,700 at project level. The addi-

tional have been made through reallocation of existing personnel and funds.

The ARS budget for Mexico and the United States will range from 10 to

30 million/year. Based on current problems and the expanded program, ARS

will not be able to adequately meet the research needs of the ARS program.

A proposal is currently before Congress to increase the Mission budget by

\$101,000/year (approximate level) and provide 3 additional SMY's.

Potential Causes of Reduced Program Effectiveness

The highest research priority is the identification of the factors

involved in the recent ineffectiveness of release lines. Candidates

reasons are:

1. Media. The factory converted to a hydroponic diet shortly

before the first outbreak in 1971. This diet has been used intensively

since that time. Sufficient data are not available to establish this

media as a good substrate for mass.

2. Associative Media. The selection of an avoidance or recognition

mechanism by wild flies over the last 12 years (resistance).

3. Behavioral Isolation. Undetected changes in rearing and handling procedures that resulted in alteration of behavior sufficient to isolate the released population (preferential mating of factory x factory flies).

4. Laboratory Adaptation of Strains. Factory strains may lose the ability to compete in the field through natural selection in the process of becoming adapted to factory production.

5. Remating. Factory males may no longer be able to satisfy the wild females in copulation. Equally possible is the selection of wild fly populations that accept multiple mating.

6. Ticks. Increase screwworm cases resulting from an increase in number of wounds caused by the Gulf Coast Tick.

7. Quality Control. Inadequate control of quality in the rearing, packaging, or distribution phase that results in the release of non-competitive insects.

8. Weather. Favorable weather which results in excessive survival of screwworm populations during the winter months.

9. Changes in Practices. Ranchers have changed their practices with the result that cattle population has increased, calving is uncontrolled, cowboys are not used in sufficient numbers to monitor the herds, etc.

While we must investigate all the above factors, our commitment for new research and improved procedures continues. Population detection methods are desperately needed for survey and evaluation. Additional control components are needed as the program moves into Mexico. The Mexico program demands more ecological data regarding distribution,

3. Behavioral Isolation. Unselected changes in rearing and handling procedures that resulted in alteration of behavior sufficient to isolate the released population (preferential mating of factory x factory flies).
4. Laboratory Adaptation of Strains. Factory strains may lose the ability to compete in the field through natural selection in the process of becoming adapted to factory production.
5. Reinforcing. Factory males may no longer be able to satisfy the wild females in copulation. Ideally possible is the selection of wild fly populations that accept multiple mating.
6. Yield. Increased survivorship rates resulting from an increase in number of females caused by the Gulf Coast Yields.
7. Quality Control. Inadequate control of quality in the rearing, packaging, or distribution phase that results in the release of non-competitive insects.
8. Weather. Favorable weather which results in excessive survival of survivor populations during the winter months.
9. Changes in Practices. Ranchers have changed their practices with the result that cattle population has increased, calving is uncontrolled, cowboys are not used in sufficient numbers to monitor the herds, etc. While we must investigate all the above factors, our commitment for new research and improved procedures continues. Population detection methods are desperately needed for survey and evaluation. Additional control components are needed as the program moves into Mexico. The Mexico program demands more ecological data regarding distribution,

abundance and overwintering. Strong possibilities exist that biotypes of the species occur in the diverse terrain of Mexico.

Current SMY's at Mission

Research Leader (J. Wendell Snow). Coordinates research and cooperative agreements (Texas A&M, University of Texas, INIA, Monterrey Tech) into the screwworm eradication program with both APHIS and the Joint Screwworm Commission. In addition, original research will be conducted by the Research Leader in the areas of ecology, attraction, and competitiveness.

Ecologist^{1/} (Billie G. Hightower--to transfer in August). Provides field research on the species in diverse Mexican locations. All the varied factors encountered in production and distribution of 200 million sterile flies per week, plus an additional 300 million weekly when the plant in Mexico is activated, must be recognized and evaluated. Behavior of wild flies in canyons and mountain saddles is of particular importance. The existence of biotypes or even distinct species in Mexico must be determined.

Radiation. (Maxwell M. Crystal). The effect of radiation on competitiveness and development of improved methods of sterilization are of principal importance. Radiation effect on competitiveness is a candidate cause of current program problems. Chemical marker techniques such as Calco Red, Rubidium, etc., that are compatible with factory production should be developed. Currently the factory and wild flies cannot be effectively

^{1/} High priority position--needs to be filled desperately.

abundance and overwintering. Strong possibilities exist that biotypes of the species occur in the diverse terrain of Mexico.

Current SMV's at Mission

Research Leader (J. Wendell Snow). Coordinates research and cooperative agreements (Texas A&M, University of Texas, IMIA, Monterrey Tech) into the current eradication program with both AMHS and the Joint Services Commission. In addition, original research will be conducted by the Research Leader in the areas of ecology, attraction, and competitiveness.

1/

Ecologist

(Billie G. Hightower--to transfer in August). Provides field research on the species in diverse Mexican localities. All the varied factors encountered in production and distribution of 300 million sterile flies per week, plus an additional 300 million weekly when the plant in Mexico is activated, must be recognized and evaluated. Behavior of wild flies in canyon and mountain habitats is of particular importance. The existence of biotypes or even distinct species in Mexico must be determined.

Radiation

(Maxwell M. Cryer). The effect of radiation on competitiveness and development of improved methods of sterilization are of principal importance. Radiation effect on competitiveness is a candidate cause of current program problems. Chemical rather techniques such as Gaseous Rad, Rb⁹⁰, etc., that are compatible with factory production should be developed. Currently the factory and wild flies cannot be effectively

1/ High priority position--needs to be filled desperately.

separated. In addition, physiological studies involving digestion, and enzyme systems are needed to support nutritional studies and develop standard laboratory evaluation systems for performance.

Entomologist. (Host and oviposition attractant, Calvin M. Jones).

Effective attractants are desperately needed for use in population surveys or as supplemental controls. We do not have a bait better than decomposing liver. Liver attracts only the female screwworm flies in addition to huge numbers of ordinary blow flies. This makes it impractical to monitor eradication progress with liver traps. Therefore, this position involves the evaluation of chemical, physical, or microbial factors associated with the wounds of animals which may be responsible for the attraction of screwworm flies to their hosts for feeding and/or oviposition.

Engineer. (John L. Goodenough). Much engineering expertise is needed in the improvement of procedures related to rearing, fly distribution and trapping. Of immediate concern is the development of equipment to remove waste products in larval rearing, separation of larvae and pupae, and the improvement of packaging and distribution equipment. Physical attractants (sound) will occupy a considerable portion of the engineer's time in addition to providing leadership in the design of traps as attraction mechanisms are found.

Nutrition Chemist. (Harold E. Brown). Dr. Brown is currently on loan from Weslaco. The chief need is in developing new or improved diets for screwworm production. The current hydroponic diet is a candidate

separated. In addition, physiological studies involving digestion, and enzyme systems are needed to support nutritional studies and develop standard laboratory evaluation systems for performance.

Entomologist. (Host and oviposition attractant, Gail M. Jones).

Effective attractants are desperately needed for use in population surveys or as supplemental controls. We do not have a bait better than decaying liver. Liver attracts only the female screwworm flies in addition to huge numbers of ordinary blow flies. This makes it impractical to monitor eradication progress with liver traps. Therefore, this position involves the evaluation of chemical, physical, or microbial factors associated with the wounds of animals which may be responsible for the attraction of screw-worm flies to their hosts for feeding and/or oviposition.

Engineer. (John L. Goodenough). Much engineering expertise is needed

in the improvement of procedures related to testing, fly distribution and trapping. Of immediate concern is the development of equipment to remove waste products in larval testing, separation of larvae and pupae, and the improvement of packaging and distribution equipment. Physical attractants (sound) will occupy a considerable portion of the engineer's time in addition to providing leadership in the design of traps as attractants are found.

Nutrition Specialist. (Harold E. Brown). Dr. Brown is currently only

loan from Weisac. The chief need is in developing new or improved diets for screwworm production. The current hydroponic diet is a candidate

cause for recent program problems. In addition, the finding of new protein sources as well as developing methods to reclaim or recycle unused proteins of the diet is important.

Additional SMY's Needed

Geneticist. This area presents a special problem for our research effort. The immediate problem is to determine the best method for introduction of genetic material into the Mission stock to insure the best interim results. At the same time, standards must be developed to insure continuous quality of reared insects. This individual must work with the Mexico ecologist to study the possibility of subpopulations or biotypes in Mexico and determine how to maintain insects suitable for the diverse terrain and weather situations of Mexico (one strain for all areas or special strains for special areas, etc.).

Entomologist. (rearing and physiology). This individual will handle the actual incorporation of genetic material into the factory strain and develop procedures to prevent factory adaptation of fly strains while retaining characteristics for good production. In addition, this individual will conduct isoenzymes studies to determine their use as monitors for laboratory population. The same technique will be used to determine the existence of biotypes (in cooperation with the geneticist and ecologist).

Ecologist. (Two). To study the biology and ecology of the screwworm. The number one priority in this research is to understand the total concept

cause for recent program problems. In addition, the finding of new protein sources as well as developing methods to isolate or recycle unused proteins of the diet is important.

Additional SMV's Needed

Geneticist. This area presents a special problem for our research effort. The immediate problem is to determine the best method for introduction of genetic material into the Mission stock to insure the best interim results. At the same time, standards must be developed to insure continuous quality of reared insects. This individual must work with the Mexico ecologist to study the possibility of subpopulations or biotypes in Mexico and determine how to maintain insects suitable for the diverse terrain and weather situations of Mexico (one strain for all areas or special strains for special areas, etc.).

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Ecologist. (Two). To study the biology and ecology of the screwworm. The number one priority in this research is to understand the total concept

of the sterile male technique as it relates to the screwworm so that the causes for recent outbreaks in the United States can be determined. Life tables will result from this work. Program effectiveness will also be evaluated by the ecologists. They will evaluate the strains for mass rearing as well as other variables before they become integrated into the program.

Entomologist. (Sex attraction and mating behavior). No effort is now being made to use sex attractants as a survey tool, and screwworm mating has never been observed in nature. This area has been long neglected and needs a full-time commitment. Sex attraction offers a method of survey as well as supplemental control. Knowledge of mating habits and behavior can be critical in the eventual success of the program.

Chemist. To direct chemical aspects of research directed toward the isolation, identification, and synthesis of host sex, oviposition, or aggregate attractants. This work is essential in cooperation with the 2 entomologists and engineer to complete the team approach in developing survey and alternate control procedures.

Entomologist. (Gulf Coast Tick). In the last few years, the Gulf Coast Tick has increased in abundance throughout South Texas. The net result has been an increase in wounds for screwworm infestation. Ticks have been cited as the principal cause of the 1973 outbreak. The situation appears similar for 1974. Little is known about the biology and control

of the sterile male technique as it relates to the screwworm so that the causes for recent outbreaks in the United States can be determined. Life tables will result from this work. Program effectiveness will also be

evaluated by the ecologists. They will evaluate the strains for mass rearing as well as other variables before they become integrated into

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Coast Tick has increased in abundance throughout South Texas. The red

result has been an increase in wounds for screwworm infestation. Ticks have

been cited as the principal cause of the 1973 outbreak. The situation

appears similar for 1974. Little is known about the biology and control

as it relates to the screwworm. Research effort is needed to provide the information necessary to control this pest. In addition, no research is currently under way to develop alternate and improved methods of screwworm control to supplement the sterile male technique.

as it relates to the environment. Research effort is needed to provide the information necessary to control this pest. In addition, no research is currently under way to develop alternate and improved methods of worm control to supplement the sterile male technique.

The sterile male technique is a method of pest control which involves the release of large numbers of sterile males into the wild population. The sterile males compete with the wild males for mates, and the resulting offspring are infertile. This technique has been used successfully for the control of several insect pests, including the tsetse fly, the house fly, and the fruit fly. The sterile male technique is a promising method of pest control, but it is still in the early stages of development. Further research is needed to improve the technique and to determine its effectiveness against a wider range of pests. The sterile male technique is a promising method of pest control, but it is still in the early stages of development. Further research is needed to improve the technique and to determine its effectiveness against a wider range of pests.

Tabular Summary of Current Personnel

Position	Grade	Title or Responsibility
J. W. Snow	14	Research Leader
M. M. Crystal	14	Radiation Biology
H. E. Brown	13	Nutrition Chemist
J. L. Goodenough	12	Engineer
B. G. Hightower	12	Ecologist
C. M. Jones	12	Entomologist (Host & Oviposition Attractant)
J. P. Turner	7	Biological Technician
E. Lopez	7	Biological Technician
F. Gonzalez	7	Agricultural Research Technician
B. Handke	5	Biological Technician
J. J. Garcia	5	Biological Aid
T. Jester	4	Clerk Typist
B. Anthony	3	Biological Aid
A. Fuentes	3	Biological Aid

1/ Includes 3 scientists for Mexico.

Amount needed to support current staff (\$65,000/SMY)	\$390,000
Current Funding	<u>343,985</u>
Deficit	\$ 46,015

Tabular Summary of Current Personnel

Position	Grade	Title or Responsibility
J. W. Snow	1A	Research Leader
M. M. Gysai	1A	Radiation Biology
H. E. Brown	1B	Radiation Chemist
J. L. Goodenough	1B	Engineer
B. G. Hightower	1B	Ecologist
G. M. Jones	1B	Entomologist (Host & Virus Attraction)
J. P. Turner	7	Biological Technician
E. Lopez	7	Biological Technician
V. Gonzalez	7	Agricultural Research Technician
B. Hendke	5	Biological Technician
J. L. Garcia	5	Biological Aid
T. Jester	4	Clerk Typist
B. Anthony	3	Biological Aid
A. Fuentes	3	Biological Aid

✓ Includes 3 scientists for Mexico.

Belice	\$ 46,015	
Current Funding	343,985	
Amount needed to support current staff (\$45,000/SM)	\$390,000	

Tabular Summary for New Personnel

<u>Position</u>	<u>Grade</u>	<u>Title or Responsibility</u>
Vacancy	12	Geneticist
Vacancy	12	Physiology-production
Vacancy	12	Chemist
Vacancy	11	Ecologist
Vacancy	11	Ecologist
Vacancy	11	Entomologist (Sex attraction)
Vacancy	11	Entomologist (Ticks)

Additional Technical Help

1	GS 7	Technician
3	GS 5	Technician
3	GS 3	Technician
1	WG 2	Laborer
1	GS 3	Clerk-typist

Amount needed to support expansion (\$65,000/SMY) \$455,000

Table 1: Summary of New Personnel

Position	Grade	Title or Responsibility
Vacancy	12	Geneticist
Vacancy	12	Physiology-production
Vacancy	12	Chemist
Vacancy	11	Ecologist
Vacancy	11	Ecologist
Vacancy	11	Entomologist (Sex attraction)
Vacancy	11	Entomologist (Hicks)
<u>Additional Technical Help</u>		
1	GS 7	Technician
3	GS 5	Technician
3	GS 3	Technician
1	WG 2	Laborer
1	GS 3	Clerk-typist

Amount needed to support expansion (\$62,000/25%) \$452,000

The total direct appropriation needed to support 13 scientists is \$845,000 (\$65,000/SMY). Currently Mission has 6 scientists and \$291,700 at project level. In addition, this estimate shows cost for 3 scientists scheduled for expansion to Mexico. Costs involved in establishing facilities in Mexico are not included. The expansion of personnel from Mission to Mexico is advantageous in that the best qualified personnel from our laboratory may be transferred. In addition, new scientists can gain screwworm experience and establish the basis for later cooperation.

Field Cage.

A field cage is needed in South Texas to conduct experiments as follows:

- a. Conduct tests to determine if assortive mating is occurring in the field. The determination of this phenomenon, if it exists, can be established and solutions found only through the use of a cage or similar device.
- b. Evaluate competitiveness of laboratory production flies against wild fly populations. In addition, effects of radiation, cold, heat, etc., on competitiveness will be evaluated.
- c. Conduct biological studies of the life cycle, circadian rhythms, host relationship, winter survival, etc.
- d. Develop and test traps designed to capture adults based on sex, sound, or host.

The total direct appropriation needed to support 15 scientists is \$845,000 (\$65,000/20). Currently Mission has 6 scientists and \$291,700 at present level. In addition, this estimate shows cost for 3 scientists scheduled for expansion to Mexico. Costs involved in establishing facilities in Mexico are not included. The expansion of personnel from Mission to Mexico is advantageous in that the best qualified personnel from our laboratory may be transferred. In addition, new scientists can gain experience and establish the basis for later cooperation.

Field Cages

A field cage is needed in South Texas to conduct experiments as

follows:

- a. Conduct tests to determine if associative mating is occurring in the field. The determination of this phenomenon, if it exists, can be established and solutions found only through the use of a cage or similar device.
- b. Evaluate competitiveness of laboratory produced flies against wild fly populations. In addition, effects of radiation, cold, heat, etc., on competitiveness will be evaluated.
- c. Conduct biological studies of the life cycle, circadian rhythms, host relationship, vector survival, etc.
- d. Develop and test traps designed to capture adults based on sex, sound, or host.

Need for Construction. Field tests to evaluate new strains or determine the effects of various procedures on fly performance are difficult and inaccurate. Usually many square miles, millions of adults, airplanes, pilots, and large ground truth teams are involved. A cage of sufficient size to permit normal fly activity will eliminate most field tests and greatly improve the overall research effort. Observations of screwworm behavior in nature are rare because of their sparse distribution. Cage observations will serve as the basis to obtain clues on mating sites, behavior, host finding, etc. The much talked about possibility of assortive mating can be established and defined only through the use of cages or similar methods.

Plan of Work. The facilities should be constructed at Weslaco, Texas, to escape the odors and high factory release population at Moore Air Base. Weslaco provides protected Federal property, year round availability, easy access and security control from Mission. In addition, the structure can be used for other research purposes once the screwworm needs are completed. The cage is probably the most needed research tool to insure adequate data in support of the screwworm eradication program.

Cost. Approximately \$296,000 (plans attached).

Funds for Cooperative Work.

Currently ARS has cooperative agreements with several US and Mexican agencies to provide outside support to screwworm research. Among these are:

Need for Construction. Wild tests to evaluate new strains or

determine the effects of various procedures on fly performance are

difficult and inaccurate. Usually many separate flies, millions of

adults, airplanes, pilots, and large ground truth teams are involved.

A cage of sufficient size to permit normal fly activity will eliminate

most field tests and greatly improve the overall research effort.

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spars distribution. Cage observations will serve as the basis to

obtain clues on mating sites, behavior, host finding, etc. The much

talked about possibility of assertive mating can be established and

defined only through the use of cages or similar methods.

Plan of Work. The facilities should be constructed at Wadsworth,

Texas, to escape the shore and high factory release population at Moore

Air Base. Wadsworth provides protected Federal property, year round

availability, easy access and security control from Houston. In addition,

the structure can be used for other research purposes once the screwworm

needs are completed. The cage is probably the most needed research tool

to insure adequate data in support of the screwworm eradication program.

Cost. Approximately \$120,000 (plans attached).

Funds for Cooperative Work.

Currently ARS has cooperative agreements with several US and Mexican

agencies to provide outside support to screwworm research. Among these

are:

- a. Instituto Nacional de Investigaciones Agricolas
- b. University of Texas
- c. Texas A&M University
- d. National Aeronautics and Space Administration
- e. Instituto Tecnologico de Monterrey

Recently, the Attractants Laboratory, Gainesville, Florida, and the radiation Laboratory, Fargo, North Dakota, have shown great interest in screwworm research. Research conducted by outside institutions is of particular importance in rounding out the Mission program. Scientists with specialized expertise can thus be involved in the program through this method. Mission needs \$200,000/year to continue to support this work.

c. Instituto Nacional de Investigaciones Agrícolas

d. University of Texas

e. Texas A&M University

f. National Aeronautics and Space Administration

g. Instituto Tecnológico de Monterrey

h. Recently, the Atlantic Laboratory, Gainesville, Florida, and

i. the Radiation Laboratory, Fargo, North Dakota, have shown great interest

j. in our work. Research conducted by outside institutions is

k. of particular importance in rounding out the Mission program. Scientists

l. with specialized expertise can thus be involved in the program through

m. this method. Mission needs \$200,000/year to continue to support this

n. work.

o. The work is being done in the laboratory of the

p. National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia.

q. The work is being done in the laboratory of the

r. National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia.

s. The work is being done in the laboratory of the

t. National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia.

u. The work is being done in the laboratory of the

v. National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia.

w. The work is being done in the laboratory of the

x. National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia.

y. The work is being done in the laboratory of the

Summary of Budget and SMY Needs on a Recurring Basis

<u>1/</u> Item	Unit
Current SMY's	6
Current Funding	\$343,985
Needed Funding (\$65,000/SMY)	\$390,000
Increase Needed	\$ 46,015

Expansion

Needed SMY's	7
Needed Funding (\$65,000/SMY)	\$455,000
Funds for Cooperative Agreements	\$200,000

Total Budget \$1,045,000 for 13 SMY's in the US and Mexico.

1/ A construction item for \$296,000 is needed for the first year to construct a field cage.

Summary of Budget and ERY Needs on a Recurring Basis

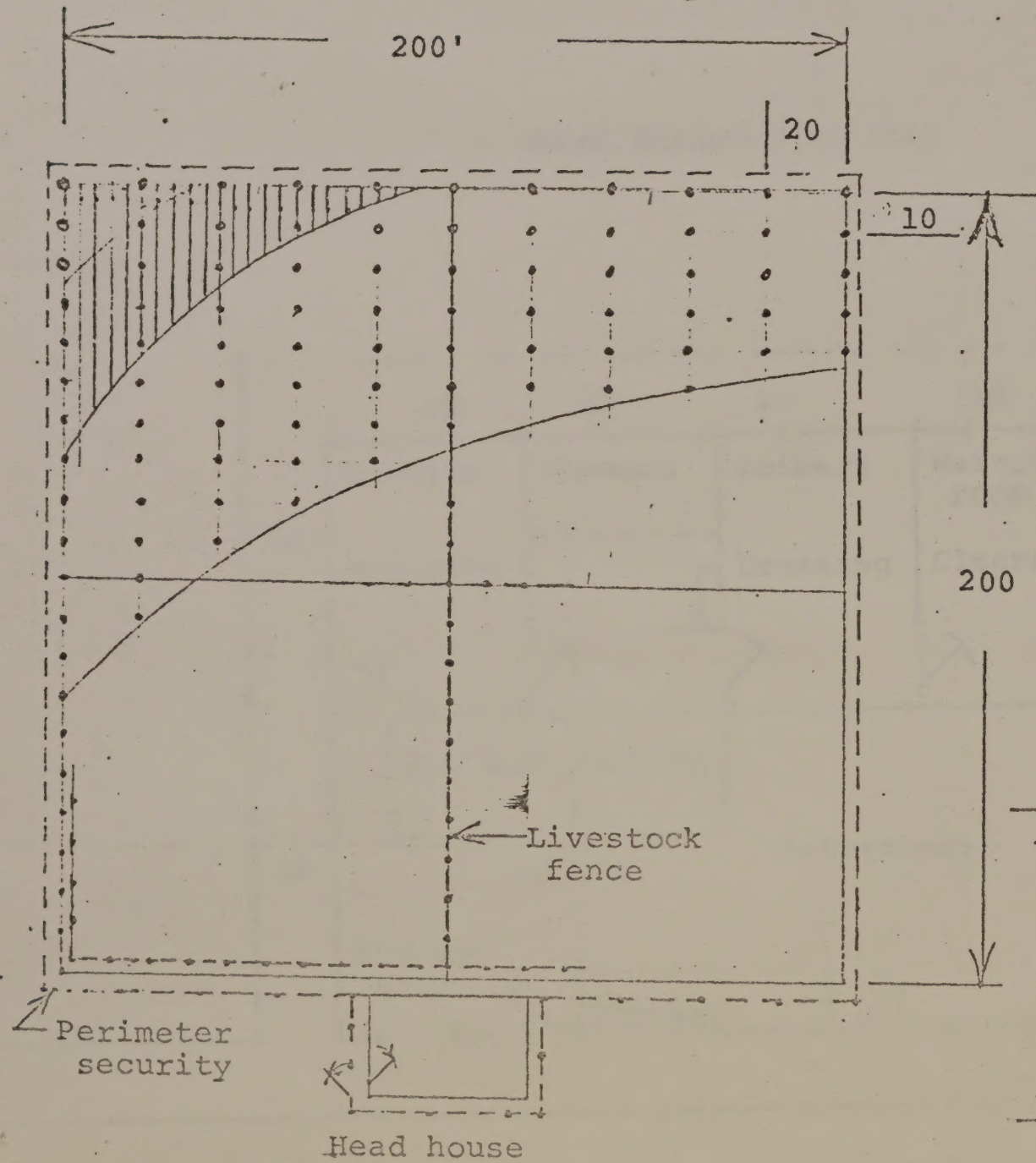
Item	Unit
Current ERY's	8
Current Funding	\$343,982
Needed Funding (\$65,000/ERY)	\$520,000
Increase Needed	\$176,018
Expansion	
Needed ERY's	7
Needed Funding (\$65,000/ERY)	\$455,000
Funds for Cooperative Agreements	\$200,000

Total Budget \$1,045,000 for 15 ERY's in the US and Mexico.

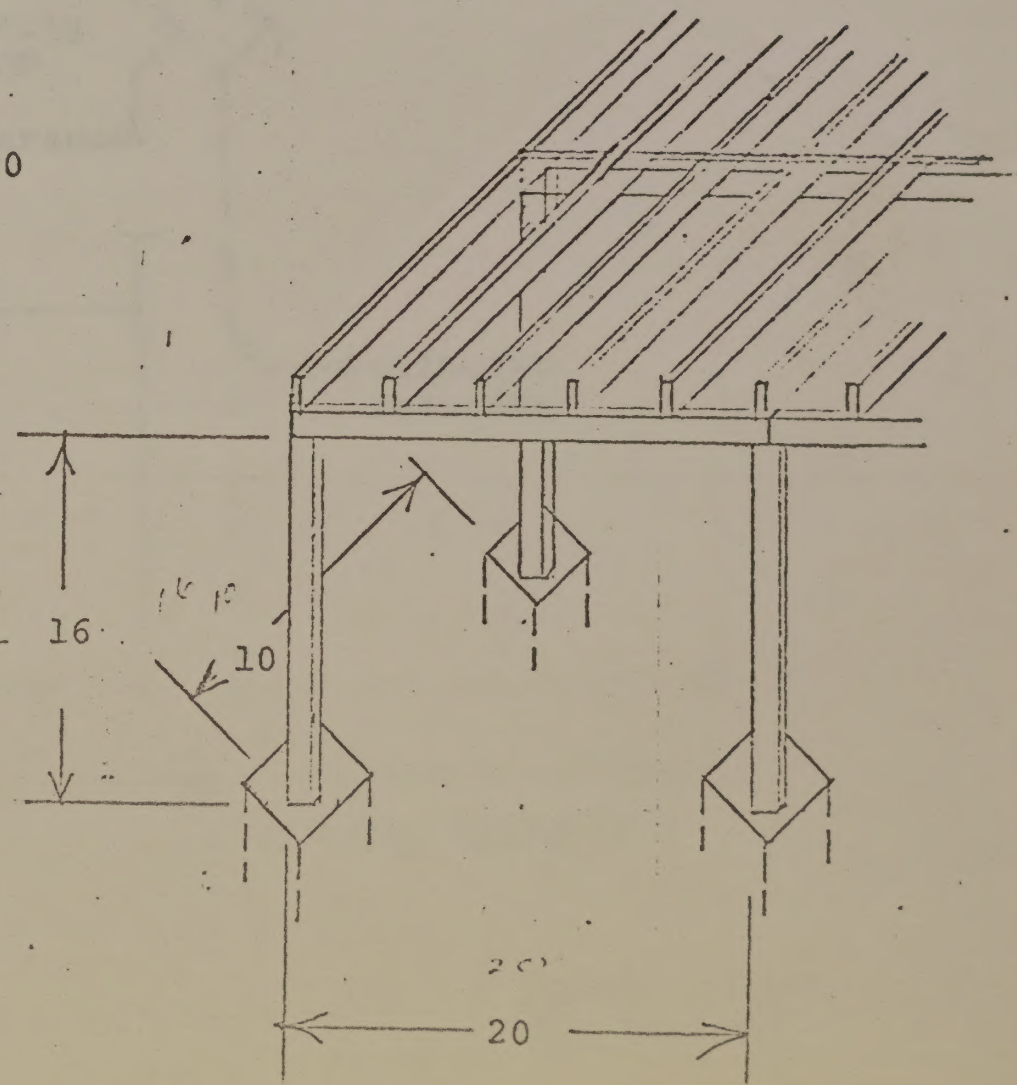
1/ A construction item for \$256,000 is needed for the first year to

construct a field cage.

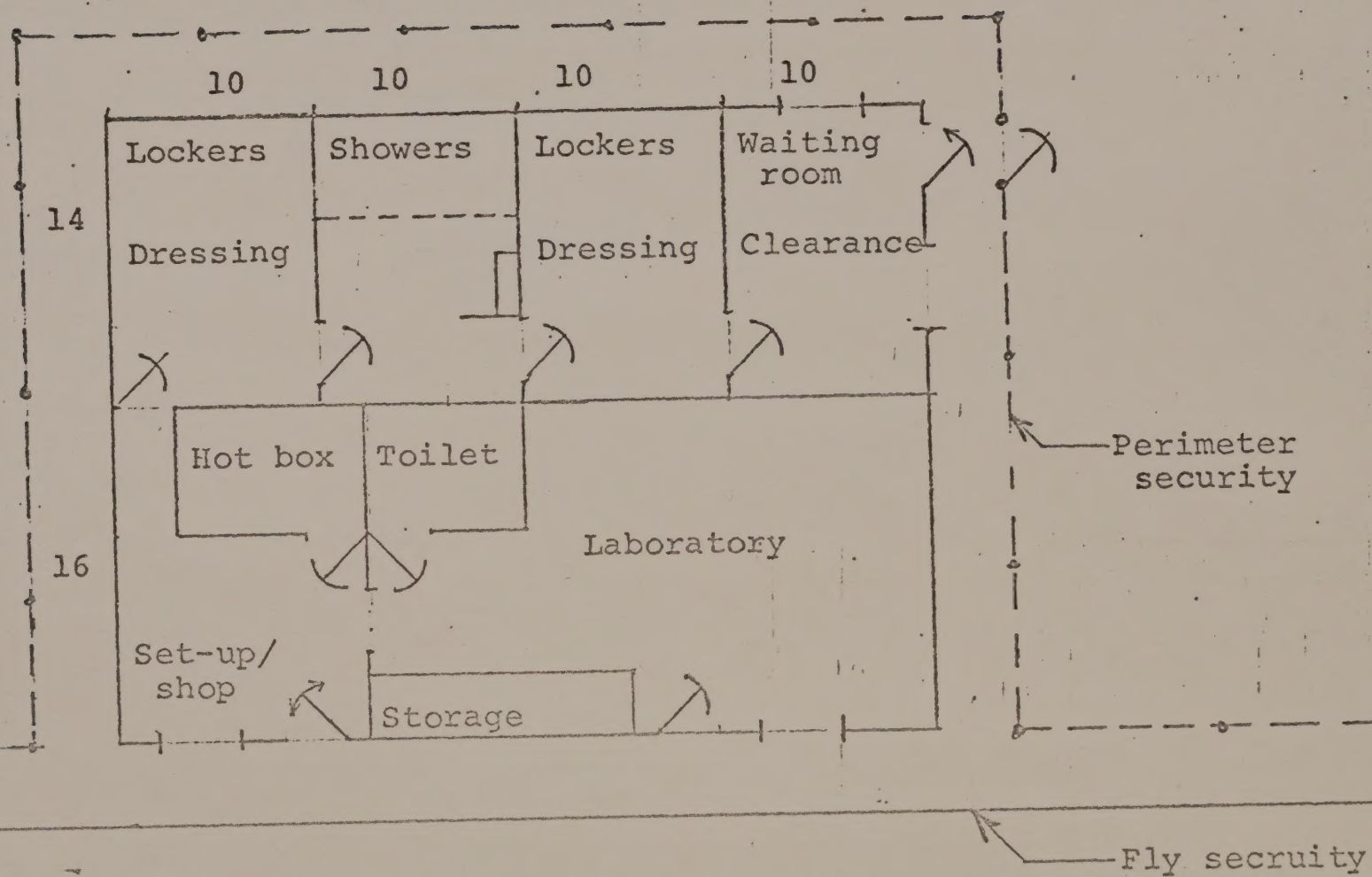
Fly Cage--Plan View



Cage support detail



Head House--Plan View



Scale: 1"=10'
JLG 5-11-74

EAT WTS

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHERN REGION
701 LOYOLA AVENUE
P. O. BOX 53326
NEW ORLEANS, LOUISIANA 70153

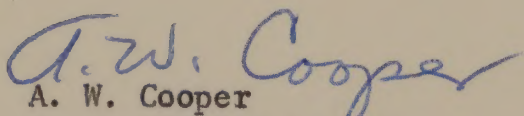
August 16, 1974

Subject: Transfer of H. E. Brown and C. J. Whitton
to Mission, Texas

To: E. A. Taylor, Area Director
Weslaco, Texas

We approve your request to transfer the above-mentioned scientists to Mission, Texas. You may shift the salary of Brown from WRU 7202-15600 to WRU 7204-11990 until the projected FY 1975 increase is allocated to Mission. At that time, the unused salary shall revert back to WRU 7202-15600.

Since the programs involved in Brown's transfer have such diverse goals, we are initiating a formal request for approval of this shift by the Office of the Administrator. A copy will be sent to your office. When Brown's transfer is formally approved, Personnel will process the necessary paper work.


A. W. Cooper
Deputy Administrator

cc:
K. Ruckert
A. D. Franklin

RECEIVED

AUG 19 1974

AREA OFFICE
WESLACO, TEXAS

August 16, 1974

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To: E. A. Taylor, Area Director
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A. W. Cooper
Deputy Administrator

cc:

E. Buckner

A. B. Franklin

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHERN REGION
701 LOYOLA AVENUE
P. O. BOX 53326
NEW ORLEANS, LOUISIANA 70153

Ed
WJL

August 22, 1974

Subject: Interagency Screwworm Coordination
Meeting

To: Judson U. McGuire, Staff Specialist
Data Systems Application Division

This is in reference to your August 14 letter regarding the above subject. I talked briefly with Del Var and Ed Taylor regarding your suggestion that Del Var attend the meeting at the Lyndon B. Johnson Space Center on August 27 and 28. He will be pleased to participate.

H C Cox

H C Cox
Associate Deputy Administrator

CC:
Del Var Petersen, Biometrician, College Station, Texas
✓ E. A. Taylor, Director, Subtropical Texas Area
Robert Snow, Assistant to Director for Management, ARS

RECEIVED

AUG 26 1974

AREA OFFICE
WESLACO, TEXAS

Screwworm Research Laboratory
P.O. Box 986 Moore Air Base
Mission, Texas 78572

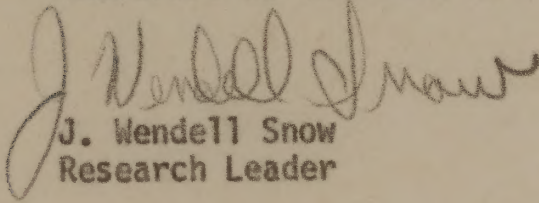
September 4, 1974

Subject: Increase in Vehicle Fleet (

To: E. A. Taylor
Area Director

A Ford $\frac{1}{2}$ ton pickup (V-15715) is scheduled for disposal but is needed in support of our Cooperative Agreement with Monterrey Tech. Liver baited traps are operated weekly in cannon situations about 50 miles from Monterrey. The truck is badly needed to provide transportation to continue this work.

Therefore an increase in fleet for Mission, Texas is requested.



J. Wendell Snow
Research Leader

SUBTROPICAL TEXAS AREA
P. O. Box 267
Weslaco, Texas 78596

September 12, 1974

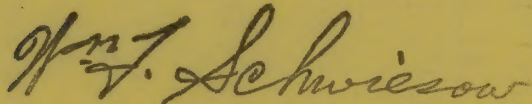
Subject: Increase in Vehicle Fleet

To: Gaston G. Beaucoudray, Personal Property
Officer

The attached request from J. Wendell Snow is forwarded for consideration. We concur with his request.

This vehicle is on loan to Dr. Enkerlin at Monterrey Tech and is part of our contribution to the cooperative research effort that is headquartered at Monterrey. With the additional personnel that are being assigned to the screwworm research as a result of the increased effort in this research program, additional vehicles will be needed to support that group. Vehicles on our inventory at Weslaco or Brownsville will be transferred to Mission if possible; however, there are no excess work vehicles available at this time.

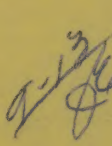
We do propose to transfer a passenger carrying vehicle from Weslaco to Mission. This will be one of the older vehicles scheduled for replacement.



Wm. F. Schwiesow
Asst. to Area Director

Enclosure

ARS:SR:WFSchwiesow:nc 9/12/74



SUBTROPICAL TEXAS AREA
P. O. Box 267
Westaco, Texas 78296

September 12, 1974

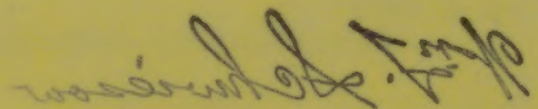
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2/100

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SOUTHERN REGION
701 LOYOLA AVENUE
P. O. BOX 24326
NEW ORLEANS, LOUISIANA 70153

*Rec'd Vini
Telecopied
9-13-74
9:50 am
JL*

September 13, 1974

Subject: Screwworm Study by Eden and Lincoln

To: E. A. Taylor, AD, Wealaco, TX

Enclosed is a copy of a letter dated September 5 from Dr. McCracken and the conclusions and recommendations made by Eden and Lincoln relating to the screwworm program. Would you please work with Dr. Snow and draft a reply to Dr. McCracken for signature in this office. To save time, you could send your draft by telecopier and we will make the final reply. We would appreciate your consulting with the appropriate NPS personnel in preparing the draft.

A. W. Cooper
A. W. Cooper
Deputy Administrator

Enclosure

Conclusions and Recommendations

Recent studies indicate that, without a screwworm management program, losses would exceed \$200 million per year in the United States.

The sterile male technique used is one of dominant lethal mutation. Sperm is transferred and eggs are fertilized but fail to hatch. The technique is inversely density dependent; the native population needs to be over-flooded by sterile males, preferably by several fold. This requires the ability to rear and sterilize large numbers of insects.

Almost 10 billion flies were reared, sterilized, and released in 1973.

The sterile male technique was used to eradicate the insect from the Island of Curacao and then from Florida in 1959. The screwworm was declared eradicated from the continental U.S. during the winter of 1964 but flies have invaded the U.S. from Mexico each summer thereafter. The 1968 outbreak was minor and 1973 was local but heavy. The 1972 outbreak was massive. Infestations are widespread in 1974 but have not yet exploded as in 1972. There were relatively few cases in the other years. 7 good, 3 fair, and 1 terrible year is not a bad track record.

*fruit flies as pest
12 effort by Texas*

Eradication from Puerto Rico is expected to be accomplished soon.

In our combined 78 years of professional work, we have not seen an area program of any kind that has the popular grower support of the South-western Screwworm Eradication Program. Economists at Texas A and M

The suggested 11 SMY will provide an acceptable effort for direct ARS input at the mission location. Of the 1 million dollars per year recommended support of \$650,000 would be ^{the minimum} needed directly by mission scientists. Inflation and the need to use some livestock in the research programs seem to justify ^{modifying past estimates and} raising a support level of \$75,000 per SMY. This about \$750,000 would go to the Serebourn Research Laboratory. The remaining, between \$250,000 and 350,000, would be available for cooperative efforts with scientists from Mexico, State Universities and to provide travel and per diem for consultant services from other ARS laboratories and state specialists.

University showed a cost benefit ratio of between 1:113 and 1:39 depending on the assumptions used about price-demand elasticity for beef.

There were no criticisms of the sterile male technique. Questions were raised to the greater frequency of cases in the past 3 years. Do they represent genetic problems or are they a reflection of unfavorable weather and other conditions? There were minor personal criticisms.

Some entomologists object to use of the word eradication as used in the legal sense by APHIS. Many eminent entomologists suggested that we not venture too deep into Mexico before our own house is in order. The paucity of research on screwworm in recent years was a frequent source

of criticism. Although critical of some aspect, no one said, "Close it down."

good
logical
with the
eradicating
statement

(a) Weather is one of the most important factors affecting the screwworm. Cold winter weather limits its successful overwintering to the extreme southern U.S. Hot, dry weather is often fatal to the pupal stage and limits adult activity. Furthermore, weather affects host numbers and distribution, as well as production of moisture and nectar essential to young adults.

Greater use should be made of weather data and its manifestations, such as the Palmer Index, as guides to screwworm numbers and distribution of sterile flies. Research with a satellite to monitor temperatures should be pursued.

Of the recent screwworm outbreaks, that of 1968 and the Arizona outbreak of 1973 can be blamed unhesitatingly on weather. Weather made notable contributions to all other outbreaks. Under these circumstances it is tempting to place too much emphasis on weather and ignore other contributing factors, known and unknown.

(b) Host populations for the screwworm in the Southwest have significantly increased. We are convinced that this factor is significantly contributory to the large number of case incidents during the "break-through" years and places increased demands on the sterile release program.

(c) Largely as a result of the screwworm program there has been a great increase in numbers of untended and poorly tended livestock and game. Calving, dehorning, castration, and branding take place throughout the

*speculation
not fact
not worth
commenting on*

year at the ranchers' convenience. This has placed even greater pressure on the sterile release program than has the mere increase in host numbers.

(d) Gulf Coast tick is only an occasional pest over a small part of the screwworm's range. Its wounds are an open invitation to screwworm and contributed heavily to the 1973 outbreak in South Texas. Other parasites furnish occasional wounds for screwworm attack but ordinarily

rank far behind navels and man-made wounds. Longer-lasting treatments for external parasites are badly needed, especially for Gulf Coast tick and screwworm.

(e) Searching for and treating screwworm cases was the labor bottleneck in the livestock industry of the southwest. The Southwest Screwworm Eradication Program removed this bottleneck and enabled cow-calf ranching in the Southwest to become an efficient operation, much as has happened with other types of agriculture. Much of the released labor migrated to cities, just as happened with other phases of agriculture. Recommendations for solution of the resultant sociological problems are beyond the scope of this report.

*Questionable
and not
really part of
the problem*

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(f) Rearing technology is excellent, especially considering that it is done in an old worn-out plant, and frequent diet changes are forced by price and lack of availability of ingredients. The plant is presently producing the most flies ever and the quality is the best ever, judged by known standards. We recommend that necessary repairs be made to keep it operational at maximum capacity until such time that it is no longer needed.

not so

good for sure
but not excellent

(g) Sterilization of 5-day-old pupae by gamma irradiation is an efficient operation that does not greatly reduce vigor or competitiveness of the flies. The dosage is about 2.5 times that necessary to sterilize the males but it seems to have no great ill effects if not exceeded. At the dosage used females do not even lay sterile eggs. No recommendation for change.

(h) Packaging, Loading and Distribution Technology is carried out

*subject to
debate*

efficiently under the circumstances. Pupae are packaged after irradiation and emergence extends over a considerable period resulting in some spent flies and some unemerged pupae at time of release. Loading is done under south Texas weather without temperature control until the plane can regulate it by altitude. Not knowing the number or location of wild flies, distribution is mostly a matter of faith.

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Learning more about number and location of wild flies should be given top research priority and fully supported.

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want of a better method, greatest reliance is placed on voluntary reporting of cases by ranchers. Research on attractants is desperately needed.

(j) Quality control and methods development of irradiation is outstanding. There is no chance of release of reproductive flies.

Per cent and uniformity of emergence and livability are routinely checked

on flown and unflown flies. Results are consistent. Fly quality is excellent by the methods used, and no better are known.

(k) With no way of measuring the wild population nor of the field effectiveness of the released flies, population geneticists have had a field day theorizing about the screwworm program.

Development of new production strains should proceed in an orderly manner as the full-time responsibility of a designated group, probably in Methods Development rather than Research.

(l) The Mexican-American Commission for Screwworm Eradication is far along organizationally. The plant is nearing completion. Many top personnel have been assigned to the project by both governments. Not only would it be embarrassing and costly to suspend operations now but advantage would be lost of the great assistance from the cattle tick eradication program scheduled for completion in 1981.

Partial failures of the Southwestern Screwworm Eradication Program for 1972-74 and our great ignorance in the vital areas of wild population ; detection, field mating habits, and field competitiveness must give pause to our optimism about proceeding with such an ambitious and expensive undertaking as eradicating screwworm from most of Mexico. However, the screwworm was eradicated from the Southeast and a barrier zone is successfully maintained in most years in the Southwest. The failures do not compare with outbreaks prior to the sterile release program.

We unhesitatingly recommend that the work of the Mexican-American Commission for Screwworm Eradication proceed on schedule.

(a) Appropriations to APHIS for production and distribution of sterile flies and for methods development have been grossly inadequate. Money has been diverted from other programs which is not good for internal

morale. Supplemental appropriations are regularly required. Production during the critical winter season has often been allowed to drop because of an uncertain budgetary situation. The presently requested budget is too modest in our opinion.

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1 million dollars per year plus the non-recurring expense of construction of a large cage for about \$300,000. We suggest reduction of the requested total of 13 SMY's to 11 SMY's with a corresponding increase in grant funds and/or transfer of ARS funds to other labs better fitted for certain highly specialized research, i.e., pheromone chemistry. A large component of the research should be directed toward the Mexican program.

Because of the great interest among scientists in sterile release and the leading position of the screwworm program in this area, provision should be made for visiting scientists. It is contemplated that they would be furnished lab and office space and routine help, but not salary.

(p) Cooperation of many agencies and organizations is required for success of the program. The lack of a common language, not only between Mexicans and Americans, but between diverse groups of scientists complicates the problems of communication.

A strong educational program is required to reach all farmers and cattle-

men to obtain their assistance in treating wounds, submitting specimens, etc. The general public should be informed to prevent scare stories and to obtain reports of infestations in dogs and horses. - Methods employed in U.S. and Mexico will differ greatly.

No. 1
Specialist
A team is needed
the problem is
screwworm out
in some remote
location

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

WASHINGTON, D.C. 20250

OFFICE OF ADMINISTRATOR

September 5, 1974

Subject: Screwworm Study by Eden and Lincoln--Transmission
of Conclusions and Recommendations

To: H. O. Graumann
Assistant Administrator

A copy of the Conclusions and Recommendations section of the Eden-Lincoln report to APHIS on screwworm is attached per our previous discussion. Would you please have this reviewed by the appropriate person(s) on your staff with particular reference to the research-related aspects. After this review, and after we have received input from the Southern Region, we should then discuss these aspects with respect to Agency research plans and budget askings. Following these discussions, then a liaison meeting will be arranged with Gil Wise and his APHIS associates. Dates and times for these will be set after we receive your review.

It would seem that we should give particular attention to these points in the recommendations:

1. Need for more ecological research, e.g., "number and location of wild flies."
2. Need for more consideration of basic biological aspects, e.g., release of flies on "applicable circadian rhythm."
3. Development of new strains in APHIS Methods Development rather than by the research group.
4. Recommended ARS screwworm research funding at \$1 million/year with cage construction at \$300,000--with increase in extramural and/or pass-through funds.
5. Provision for visiting scientists.

Presumably additional components of the Eden-Lincoln report will be available later.

Ralph J. McCracken

Ralph J. McCracken
Associate Administrator

Enclosure

*needs better
definition*

Confirmation

Est
WSS

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

SOUTHERN REGION
701 LOYOLA AVENUE

P. O. BOX 53326

NEW ORLEANS, LOUISIANA 70153

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A. W. Cooper

A. W. Cooper
Deputy Administrator

Enclosure

RECEIVED

SEP 16 1974

AREA OFFICE
WESLACO, TEXAS

→ Sent via telecopier 9/13/74
Lucy

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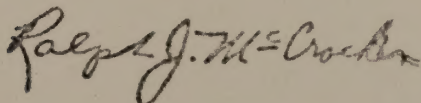
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4. Recommended ARS screwworm research funding at \$1 million/year with cage construction at \$300,000--with increase in extramural and/or pass-through funds.
5. Provision for visiting scientists.

Presumably additional components of the Eden-Lincoln report will be available later.



Ralph J. McCracken
Associate Administrator

Enclosure

cc:
A. W. Cooper

ROUTING AND TRANSMITTAL SLIP		ACTION
1 TO (Name, office symbol or location) A. W. Cooper Deputy Administrator	INITIALS	CIRCULATE
	DATE	COORDINATION
2	INITIALS	FILE
	DATE	INFORMATION
3	INITIALS	NOTE AND RETURN
	DATE	PER CON - VERSATION
4	INITIALS	SEE ME
	DATE	SIGNATURE

*Confirming copy
per-mailed
9/16/74
JL*

REMARKS

Please refer to your copy of our letter of August 14, 1974 to Dr. W. G. Eden for a copy of the Mission proposal referred to at the end of attached memorandum.

A copy of the proposal will accompany the confirming copy of this transmittal.

*See telecopier 9/16/74
11:30 a.m. JL*

Do NOT use this form as a RECORD of approvals, concurrences, disapprovals, clearances, and similar actions.

FROM (Name, office symbol or location) E. A. Taylor, AD Weslaco, TX	DATE 9/16/74
	PHONE

A. W. Cooper
Deputy Administrator

Please refer to your copy of our letter of August 14, 1974 to Dr. W. G. Egan for a copy of the Mission proposal referred to at the end of attached memorandum.

A copy of the proposal will accompany the continuing copy of this transmittal.

2/16/75

E. A. Taylor, AD
Weslaco, TX

ROUTING AND TRANSMITTAL SLIP		ACTION
1 TO (Name, office symbol or location) M. T. Ouye, PAC	INITIALS	CIRCULATE
	DATE	COORDINATION
2	INITIALS	FILE
	DATE	INFORMATION
3	INITIALS	NOTE AND RETURN
	DATE	PER CON - VERSATION
4	INITIALS	SEE ME
	DATE	SIGNATURE
REMARKS The <u>proposal</u> referred to at the end of the attached memorandum is the same one which was transmitted to you Friday afternoon. A copy of the proposal will be forwarded to you with the confirming copy of attached via air-mail today. <i>Confirming copy air mailed 9/16/74 JL</i> Do NOT use this form as a RECORD of approvals, concurrences, disapprovals, clearances, and similar actions.		
FROM (Name, office symbol or location) E. A. Taylor, AD Weslaco, TX		DATE 9/16/74 PHONE

SUBTROPICAL TEXAS AREA
P. O. Box 267
Weslaco, Texas 78596

September 16, 1974

Subject: Screwworm Study by Eden and Lincoln

To: A. W. Cooper, Deputy Administrator
Southern Region, ARS-USDA
New Orleans, LA.

As requested in your memo of September 13, 1974, the following is a draft of a reply to cover the conclusions and recommendations by Eden and Lincoln and the five points raised in Dr. R. J. McCracken's memo of September 5, 1974.

We share the conclusion regarding the overall value of the program and its economic input on the livestock industry. The industry could not survive in its present form without the program. In addition, this program was conceived, researched, developed, and executed largely with Department of Agriculture personnel and stands as the best example of USDA service to American agriculture.

The criticism of minimal research activities is factual but understandable in the context of time. All programs within ARS were cut, and screwworm was no exception. Many scientists transferred during this period and were replaced by scientists near retirement. The situation was non-conducive to a strong research program.

SUBTROPICAL TEXAS AREA
P. O. Box 367
Weslaco, Texas 78596

September 16, 1974

Subject: Screwworm Study by Egan and Lincoln
To: A. W. Cooper, Deputy Administrator
Southern Region, ARS-USDA
New Orleans, LA.

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2.

With the outbreak of 1972, ARS became aware of the situation and has taken corrective action, within budget and manpower limitations. Currently seven scientists are at Mission, with a budget of about \$290,000. Most of the additions have been obtained through redirection that has involved curtailment of other ARS programs.

Comments regarding the specific five items directed at ARS:

(1) The need for ecological research, particularly in Mexico, is critical. The comment regarding fly releases based on speculation is valid and must be corrected. Their comment regarding more research in remote sensing (in cooperation with NASA) and importance of weather data should be included under this item.

(2) ARS has conducted little research on circadian rhythms and left this area to Methods Development (APHIS). The criticism is valid and the entire area will be evaluated and appropriate action taken. The provision of \$300,000 for a field cage will assist in accomplishing this objective.

(3) The development of new strains has been an ARS function and ARS can and should continue to supply material for new strains.

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3.

(4) The suggested 11 SMY will provide an acceptable effort for direct ARS input at the Mission location. Two or three of these SMY will be assigned full time to Mexico. We are presently working, through cooperative agreement, with Mexico scientists. The recommended funding will permit ARS to more than double this cooperation. Cooperative work with State universities and other outside agencies can also be expanded as appropriate.

(5) Visiting scientists have been utilized as budget permitted in the last year. This is a workable research arrangement, but unfortunately other laboratories are generally unwilling to shift their support funds to screwworm research and Mission is unable to support their research.

In conclusion, the Committee appeared to grasp the screwworm situation in a short time. However, they did not mention all needed research or give explanation in the conclusion and recommendations for recent outbreaks, other than in terms of weather, increased animals, lack of cowboys, etc. Therefore, attached is a proposal prepared by the Mission ARS Laboratory that covers all areas.

E. A. Taylor

E. A. Taylor
Area Director

Enclosure

cc:

M. T. Ouye
L. S. Henderson

*copy to JWSnow
9-16-74
JE*

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E. A. Taylor
E. A. Taylor
Area Director

Enclosure

cc:
M. T. Ouyes
L. S. Henderson

*Copy to
12 Oct 74
13 Oct 74
14 Oct 74
15 Oct 74
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CURRENT MISSION RESEARCH STATUS AND REQUIRED CHANGES TO MEET RESEARCH NEEDS FOR THE EXPANDED SCREWORM ERADICATION PROGRAM

History of Program

From 1962 to 1971 (with a minor exception in 1968), the screwworm eradication program successfully controlled screwworms in the United States. During this time, the ARS Research Laboratory was established (1963) at Mission with a budget of \$200,000/year. However, support was allocated through the Kerrville Laboratory and passed to Mission based on numbers of SMY's rather than appropriated funds. During this period, professionals transferred or retired without replacement. From a maximum of 6 staff members in 1963, only 3 remained committed to screwworm research by 1972.

During 1972, the program suffered a serious setback in the southwestern states. A total of 96,625 cases were reported in Texas alone. There were undoubtedly more unreported cases. During this year, the United States signed an agreement with Mexico to extend the eradication program to the Isthmus of Tehuantepec.

During 1973, the situation was again serious in South Texas. Some ranchers reported as much as 30% loss of herds. Effective control was not obtained until late in the season. This outbreak was related to high populations of the Gulf Coast Tick that provided large numbers of wounds. In 1974 the situation through June indicates another bad year. Infestations are currently 3 times greater than 1973 and range throughout most of Texas. Gulf Coast Ticks are becoming common in South Texas.

Therefore, it becomes apparent that the screwworm program has been extended to include Mexico at a time when results suggest that serious problems exist in our current program. The Agricultural Research Service recognized this after the 1972 outbreak and began restaffing the laboratory and transferring support funds. Currently, 5 SMY's are at Mission with a chemist on loan from Food Crops Utilization Research, Weslaco, Texas. The current approved budget for FY 75 is \$291,700 at project level. The additions have been made through reallocation of existing personnel and funds. The APHIS budget for Mexico and the United States will range from 16 to 20 million/year. Based on current problems and the expanded program, ARS will not be able to adequately meet the research needs of the APHIS program. A proposal is currently before Congress to increase the Mission budget by \$202,000/year (appropriation level) and provide 3 additional SMY's.

Potential Causes of Reduced Program Effectiveness

The highest research priority is the identification of the factors involved in the recent ineffectiveness of release flies. Candidate reasons are:

1. Nutrition. The factory converted to a hydroponic diet shortly before the first outbreak in 1972. This diet has been used intermittently since that time. Sufficient data are not available to establish this medium as a good substitute for meat.

2. Assortive Mating. The selection of an avoidance or recognition mechanism by wild flies over the last 12 years (resistance).

control components are needed as the program moves into Mexico. The Mexico program demands more ecological data regarding distribution,

3. Behavioral Isolation. Undetected changes in rearing and handling procedures that resulted in alteration of behavior sufficient to isolate the released population (preferential mating of factory x factory flies).

4. Laboratory Adaptation of Strains. Factory strains may lose the ability to compete in the field through natural selection in the process of becoming adapted to factory production.

5. Remating. Factory males may no longer be able to satisfy the wild females in copulation. Equally possible is the selection of wild fly populations that accept multiple mating.

6. Ticks. Increase screwworm cases resulting from an increase in number of wounds caused by the Gulf Coast Tick.

7. Quality Control. Inadequate control of quality in the rearing, packaging, or distribution phase that results in the release of non-competitive insects.

8. Weather. Favorable weather which results in excessive survival of screwworm populations during the winter months.

9. Changes in Practices. Ranchers have changed their practices with the result that cattle population has increased, calving is uncontrolled, cowboys are not used in sufficient numbers to monitor the herds, etc.

While we must investigate all the above factors, our commitment for new research and improved procedures continues. Population detection methods are desperately needed for survey and evaluation. Additional control components are needed as the program moves into Mexico. The Mexico program demands more ecological data regarding distribution,

abundance and overwintering. Strong possibilities exist that biotypes of the species occur in the diverse terrain of Mexico.

Current SMY's at Mission

Research Leader (J. Wendell Snow). Coordinates research and cooperative agreements (Texas A&M, University of Texas, INIA, Monterrey Tech) into the screwworm eradication program with both APHIS and the Joint Screwworm Commission. In addition, original research will be conducted by the Research Leader in the areas of ecology, attraction, and competitiveness.

1/ Ecologist (Billie G. Hightower--to transfer in August). Provides field research on the species in diverse Mexican locations. All the varied factors encountered in production and distribution of 200 million sterile flies per week, plus an additional 300 million weekly when the plant in Mexico is activated, must be recognized and evaluated. Behavior of wild flies in canyons and mountain saddles is of particular importance. The existence of biotypes or even distinct species in Mexico must be determined.

Radiation. (Maxwell M. Crystal). The effect of radiation on competitiveness and development of improved methods of sterilization are of principal importance. Radiation effect on competitiveness is a candidate cause of current program problems. Chemical marker techniques such as Calco Red, Rubidium, etc., that are compatible with factory production should be developed. Currently the factory and wild flies cannot be effectively

1/ High priority position--needs to be filled desperately.

separated. In addition, physiological studies involving digestion, and enzyme systems are needed to support nutritional studies and develop standard laboratory evaluation systems for performance.

Entomologist. (Host and oviposition attractant, Calvin M. Jones).

Effective attractants are desperately needed for use in population surveys or as supplemental controls. We do not have a bait better than decomposing liver. Liver attracts only the female screwworm flies in addition to huge numbers of ordinary blow flies. This makes it impractical to monitor eradication progress with liver traps. Therefore, this position involves the evaluation of chemical, physical, or microbial factors associated with the wounds of animals which may be responsible for the attraction of screwworm flies to their hosts for feeding and/or oviposition.

Engineer. (John L. Goodenough). Much engineering expertise is needed in the improvement of procedures related to rearing, fly distribution and trapping. Of immediate concern is the development of equipment to remove waste products in larval rearing, separation of larvae and pupae, and the improvement of packaging and distribution equipment. Physical attractants (sound) will occupy a considerable portion of the engineer's time in addition to providing leadership in the design of traps as attraction mechanisms are found.

Nutrition Chemist. (Harold E. Brown). Dr. Brown is currently on loan from Weslaco. The chief need is in developing new or improved diets for screwworm production. The current hydroponic diet is a candidate

cause for recent program problems. In addition, the finding of new protein sources as well as developing methods to reclaim or recycle unused proteins of the diet is important.

Additional SMY's Needed

Geneticist. This area presents a special problem for our research effort. The immediate problem is to determine the best method for introduction of genetic material into the Mission stock to insure the best interim results. At the same time, standards must be developed to insure continuous quality of reared insects. This individual must work with the Mexico ecologist to study the possibility of subpopulations or biotypes in Mexico and determine how to maintain insects suitable for the diverse terrain and weather situations of Mexico (one strain for all areas or special strains for special areas, etc.).

Entomologist. (rearing and physiology). This individual will handle the actual incorporation of genetic material into the factory strain and develop procedures to prevent factory adaptation of fly strains while retaining characteristics for good production. In addition, this individual will conduct isoenzymes studies to determine their use as monitors for laboratory population. The same technique will be used to determine the existence of biotypes (in cooperation with the geneticist and ecologist).

Ecologist. (Two). To study the biology and ecology of the screwworm. The number one priority in this research is to understand the total concept

of the sterile male technique as it relates to the screwworm so that the causes for recent outbreaks in the United States can be determined. Life tables will result from this work. Program effectiveness will also be evaluated by the ecologists. They will evaluate the strains for mass rearing as well as other variables before they become integrated into the program.

Entomologist. (Sex attraction and mating behavior). No effort is now being made to use sex attractants as a survey tool, and screwworm mating has never been observed in nature. This area has been long neglected and needs a full-time commitment. Sex attraction offers a method of survey as well as supplemental control. Knowledge of mating habits and behavior can be critical in the eventual success of the program.

Chemist. To direct chemical aspects of research directed toward the isolation, identification, and synthesis of host sex, oviposition, or aggregate attractants. This work is essential in cooperation with the 2 entomologists and engineer to complete the team approach in developing survey and alternate control procedures.

Entomologist. (Gulf Coast Tick). In the last few years, the Gulf Coast Tick has increased in abundance throughout South Texas. The net result has been an increase in wounds for screwworm infestation. Ticks have been cited as the principal cause of the 1973 outbreak. The situation appears similar for 1974. Little is known about the biology and control

as it relates to the screwworm. Research effort is needed to provide the information necessary to control this pest. In addition, no research is currently under way to develop alternate and improved methods of screwworm control to supplement the sterile male technique.

Position	Grade	Title or Responsibility
J. W. Snow	14	Research Leader
M. N. Crystal	14	Radiation Biology
H. E. Brown	13	Nutrition Chemist
J. L. Goodenough	12	Engineer
E. G. Hightower	12	Ecologist
G. M. Jones	12	Entomologist (Host & Oviposition Attractant)
J. E. Turner	7	Biological Technician
E. Lopez	7	Biological Technician
F. Gonzalez	7	Agricultural Research Technician
D. Handke	5	Biological Technician
J. J. Garcia	5	Biological Aid
T. Jester	4	Clerk Typist
B. Anthony	3	Biological Aid
A. Fuentes	3	Biological Aid

1/ Includes 3 scientists for Mexico.

Amount needed to support current staff (\$65,000/SMY)	\$390,000
Current Funding	<u>343,985</u>
Deficit	\$ 46,015

Tabular Summary of Current Personnel

Position	Grade	Title or Responsibility
J. W. Snow	14	Research Leader
M. M. Crystal	14	Radiation Biology
H. E. Brown	13	Nutrition Chemist
J. L. Goodenough	12	Engineer
B. G. Hightower	12	Ecologist
C. M. Jones	12	Entomologist (Host & Oviposition Attractant)
Vacancy	11	Entomologist (Ticks)
J. P. Turner	7	Biological Technician
E. Lopez	7	Biological Technician
F. Gonzalez	7	Agricultural Research Technician
B. Handke	5	Biological Technician
J. J. Garcia	5	Biological Aid
T. Jester	4	Clerk Typist
B. Anthony	3	Biological Aid
A. Fuentes	3	Biological Aid

1/ Includes 3 scientists for Mexico.

Amount needed to support current staff (\$65,000/SMY)	\$390,000
Current Funding	<u>343,985</u>
Deficit	\$ 46,015

Tabular Summary for New Personnel

Position	Grade	Title or Responsibility
Vacancy	12	Geneticist
Vacancy	12	Physiology-production
Vacancy	12	Chemist
Vacancy	11	Ecologist
Vacancy	11	Ecologist
Vacancy	11	Entomologist (Sex attraction)
Vacancy	11	Entomologist (Ticks)

Additional Technical Help

1	GS 7	Technician
3	GS 5	Technician
3	GS 3	Technician
1	WG 2	Laborer
1	GS 3	Clerk-typist

Amount needed to support expansion (\$65,000/SMY) \$455,000

The total direct appropriation needed to support 13 scientists is \$845,000 (\$65,000/SMY). Currently Mission has 6 scientists and \$291,700 at project level. In addition, this estimate shows cost for 3 scientists scheduled for expansion to Mexico. Costs involved in establishing facilities in Mexico are not included. The expansion of personnel from Mission to Mexico is advantageous in that the best qualified personnel from our laboratory may be transferred. In addition, new scientists can gain screwworm experience and establish the basis for later cooperation.

Field Cage.

A field cage is needed in South Texas to conduct experiments as follows:

- a. Conduct tests to determine if assortive mating is occurring in the field. The determination of this phenomenon, if it exists, can be established and solutions found only through the use of a cage or similar device.
- b. Evaluate competitiveness of laboratory production flies against wild fly populations. In addition, effects of radiation, cold, heat, etc., on competitiveness will be evaluated.
- c. Conduct biological studies of the life cycle, circadian rhythms, host relationship, winter survival, etc.
- d. Develop and test traps designed to capture adults based on sex, sound, or host.

Need for Construction. Field tests to evaluate new strains or determine the effects of various procedures on fly performance are difficult and inaccurate. Usually many square miles, millions of adults, airplanes, pilots, and large ground truth teams are involved. A cage of sufficient size to permit normal fly activity will eliminate most field tests and greatly improve the overall research effort. Observations of screwworm behavior in nature are rare because of their sparse distribution. Cage observations will serve as the basis to obtain clues on mating sites, behavior, host finding, etc. The much talked about possibility of assortive mating can be established and defined only through the use of cages or similar methods.

Plan of Work. The facilities should be constructed at Weslaco, Texas, to escape the odors and high factory release population at Moore Air Base. Weslaco provides protected Federal property, year round availability, easy access and security control from Mission. In addition, the structure can be used for other research purposes once the screwworm needs are completed. The cage is probably the most needed research tool to insure adequate data in support of the screwworm eradication program.

Cost. Approximately \$296,000 (plans attached).

Funds for Cooperative Work.

Currently ARS has cooperative agreements with several US and Mexican agencies to provide outside support to screwworm research. Among these are:

- Summary
- | | |
|--|-----------|
| a. Instituto Nacional de Investigaciones Agricolas | |
| b. University of Texas | |
| c. Texas A&M University | Unit |
| d. National Aeronautics and Space Administration | |
| e. Instituto Tecnologico de Monterrey | \$343,985 |

Recently, the Attractants Laboratory, Gainesville, Florida, and the radiation Laboratory, Fargo, North Dakota, have shown great interest in screwworm research. Research conducted by outside institutions is of particular importance in rounding out the Mission program. Scientists with specialized expertise can thus be involved in the program through this method. Mission needs \$200,000/year to continue to support this work.

Funds for Cooperative Agreements	\$200,000
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Total Budget \$1,045,000 for 13 SMT's in the US and Mexico.

- 1/ A construction item for \$296,000 is needed for the first year to construct a field cage.

Summary of Budget and SMY Needs on a Recurring Basis

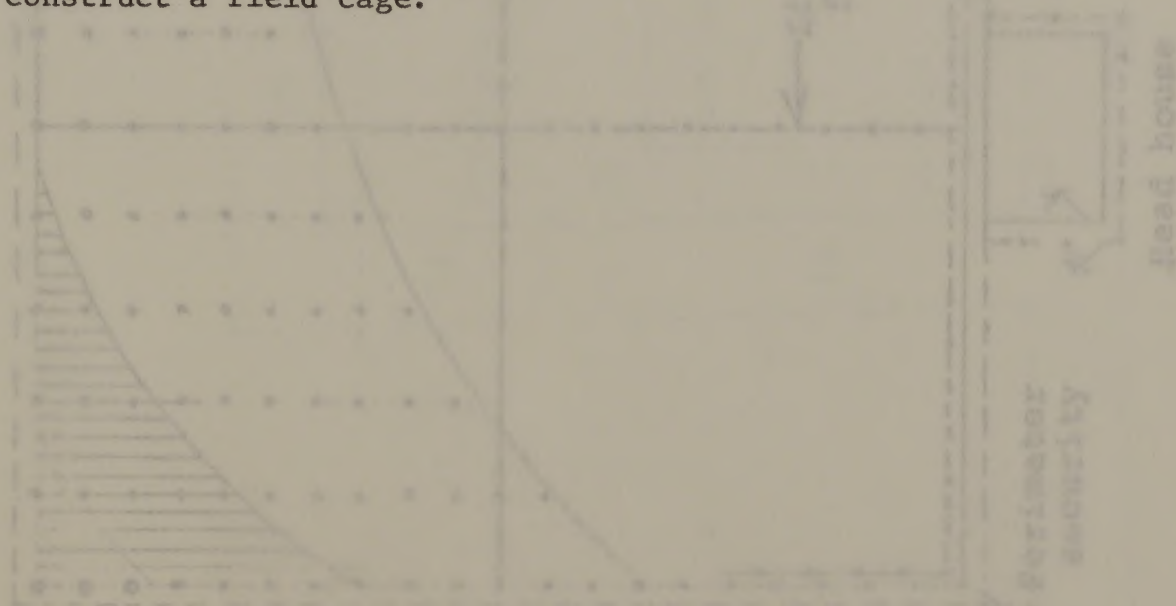
<u>1/</u> Item	Unit
Current SMY's	6
Current Funding	\$343,985
Needed Funding (\$65,000/SMY)	\$390,000
Increase Needed	\$ 46,015

Expansion

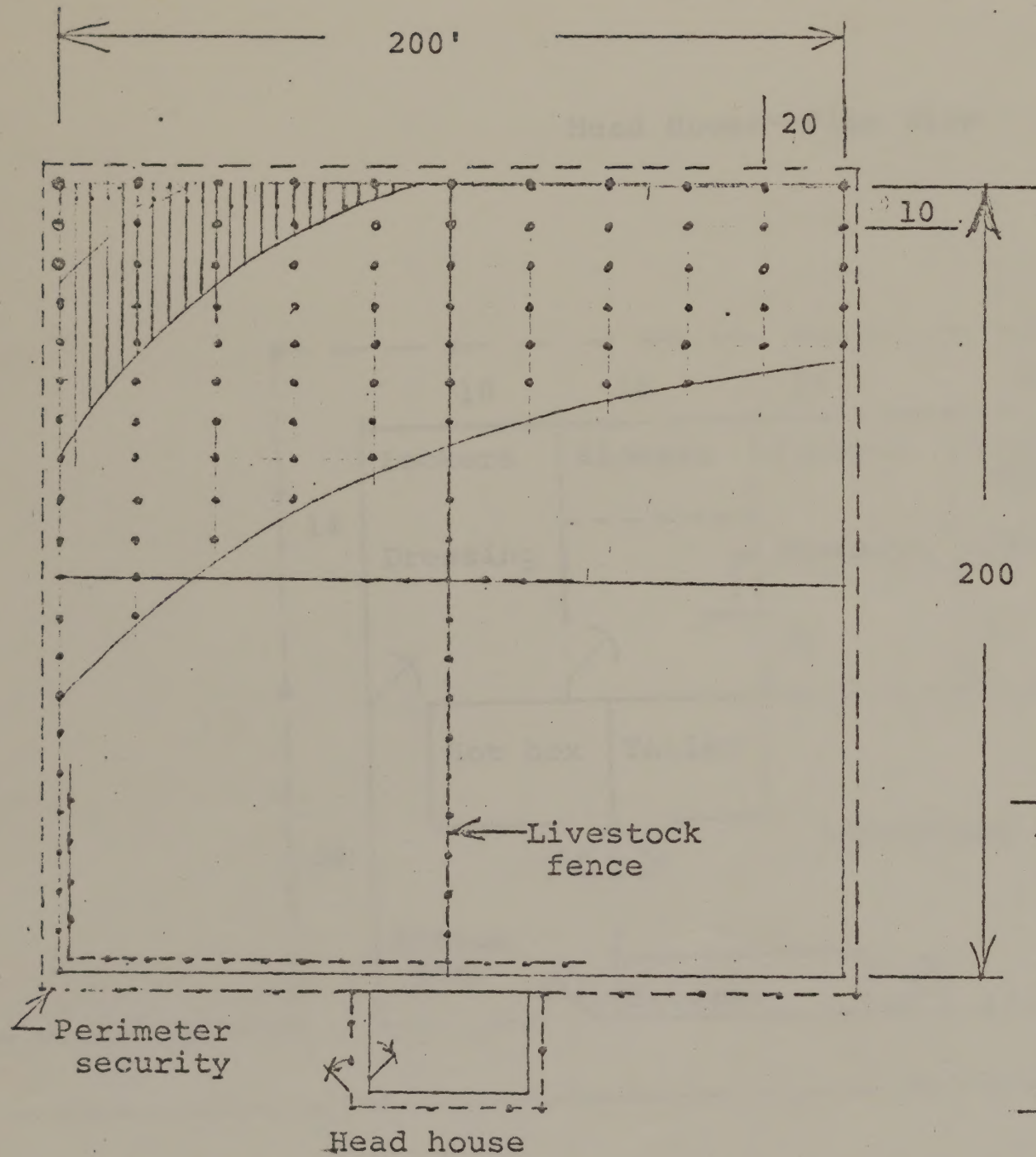
Needed SMY's	7
Needed Funding (\$65,000/SMY)	\$455,000
Funds for Cooperative Agreements	\$200,000

Total Budget \$1,045,000 for 13 SMY's in the US and Mexico.

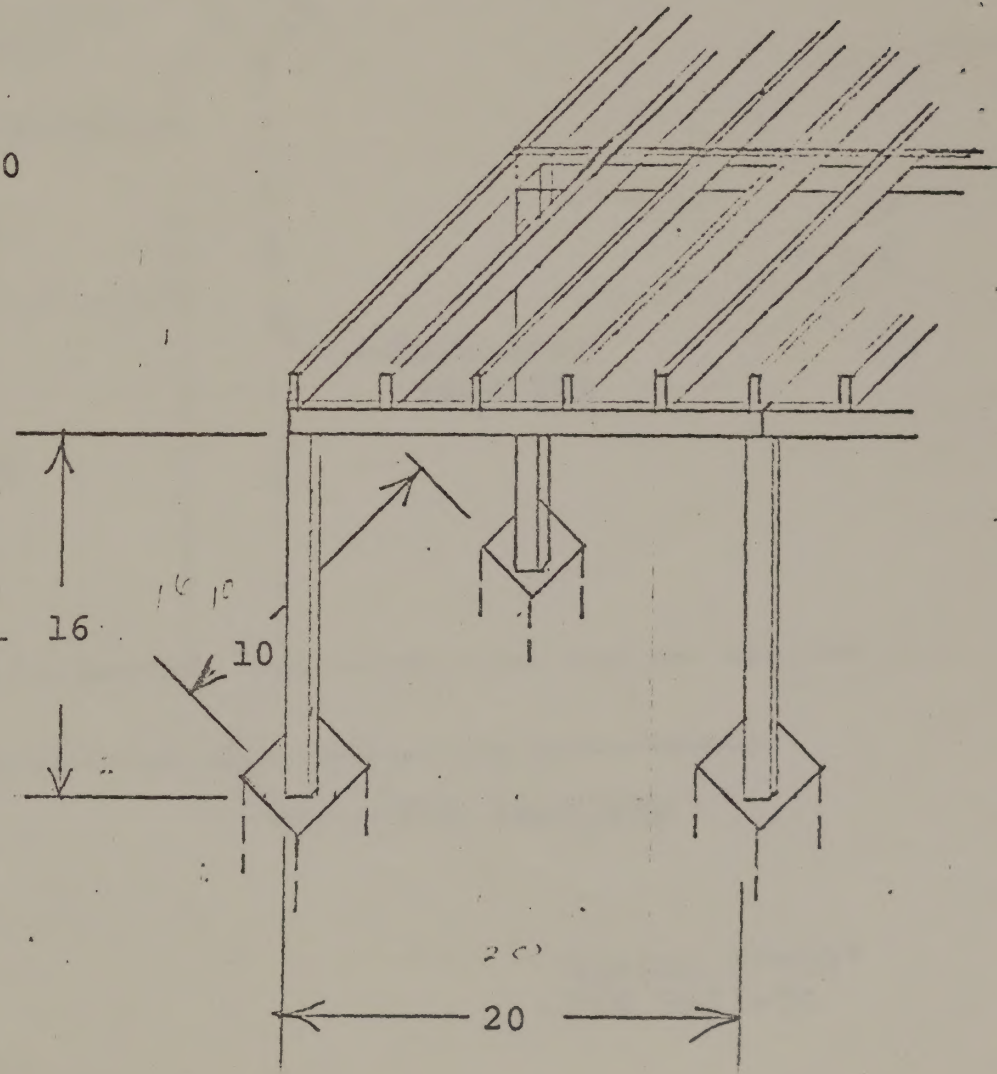
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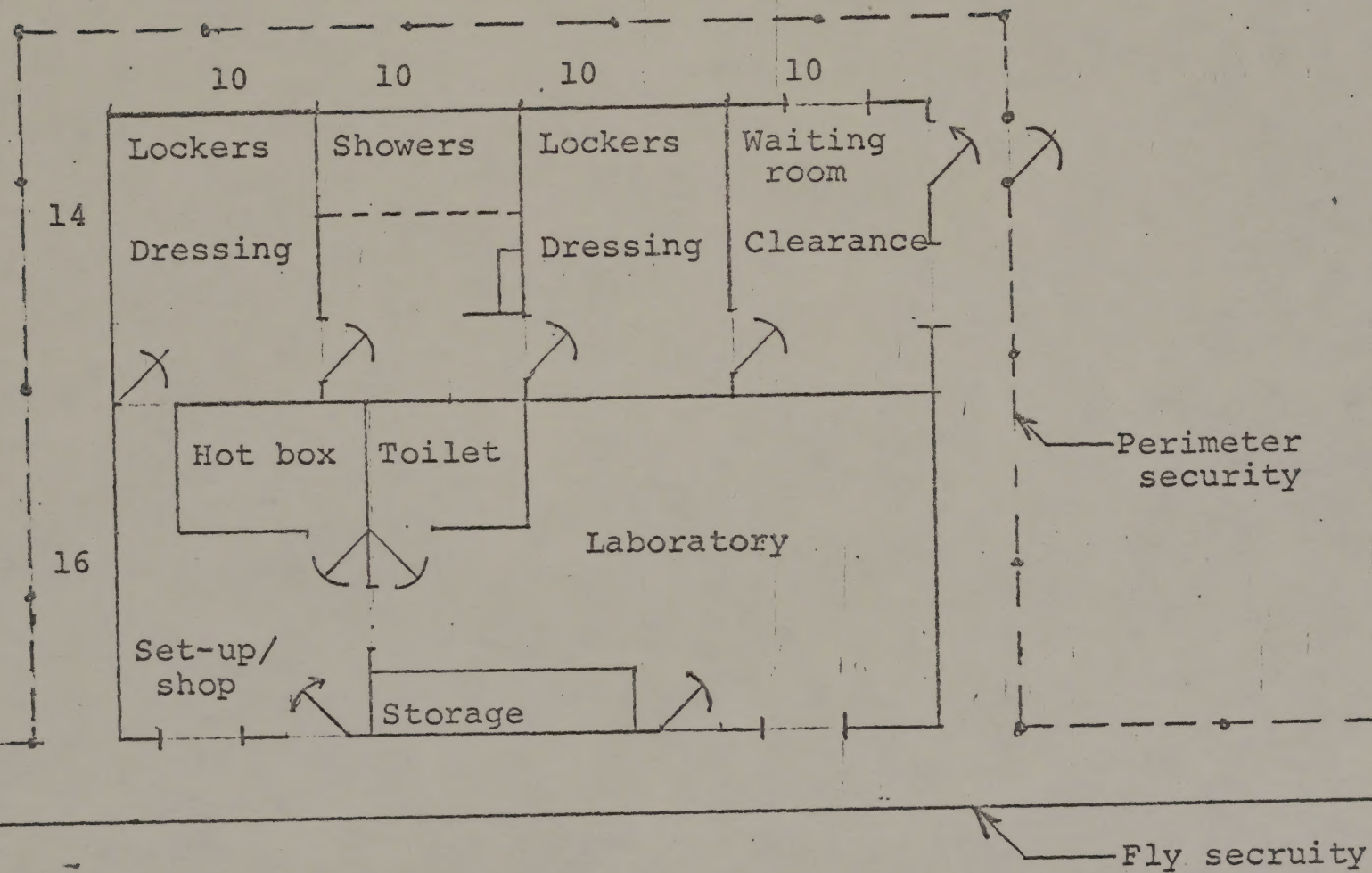
Fly Cage--Plan View



Cage support detail



Head House--Plan View



Scale: 1"=10'
JLG 5-11-74

☒ EAT *EAT*
☒ WFS *WFS*
☐ JE *J*
☐ NC

Screwworm Research Laboratory
P. O. Box 986
Mission, Texas 78572

September 30, 1974

Subject: Involvement in Mass Rearing--September 1974

To: Dr. Jack G. Griffin ①
USDA, ARS, SR
Boll Weevil Research Laboratory
Mississippi State, Mississippi 39762

My activities centered around field trials to evaluate several fly trap modifications. We continued efforts to establish a productive shop.

APHIS personnel have requested engineering help in such areas as design of an improved carrying case for use in fly dispersal and to develop a hydro-distribution system that will standardize larval feeding. Some time was spent on these. I hope to be able to devote more time on these next month. However, much of this type of work will have to be delayed until after the field trapping season.

I noticed that J. A. Miller, Agricultural Engineer, Kerrville, TX, is involved in the mass rearing of horn flies. Their Quarterly Report indicated a production level of approximately 1.5 m/week.

John L. Goodenough

John L. Goodenough
Agricultural Engineer

cc: L. B. Altman
✓ E. A. Taylor
J. Hollingsworth

① Jack is TA for mass rearing of Insects, SR

RECEIVED

OCT 2 1974

AREA OFFICE
WESLACO, TEXAS

EAT
not

Screwworm Research Laboratory
P. O. Box 986 Moore Air Base
Mission, Texas 78572

October 18, 1974

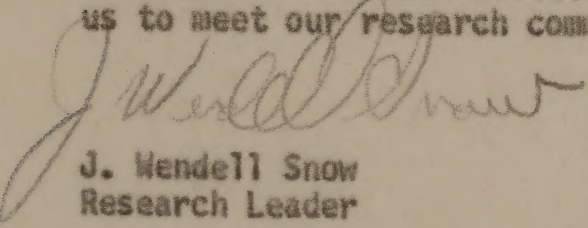
Subject: New Research Personnel

To: S. C. Gartman
D. L. Williams
APHIS, Screwworm Eradication
Hyattsville, Maryland

Recently, Dr. C. J. Whitten has been added to our research staff and will work in the area of strain development. His area of responsibility will also include the investigation of biotype existence and the development of procedures to ensure fly quality. The latter research involves isoenzymes, genetic selection, and other biological evaluations.

Dr. Frank S. Guillot has also joined our staff and will work on sex behavior of the screwworm. His principle effort will be directed toward determining attraction mechanisms and the development of procedures to utilize this attraction in survey or control.

Both men are welcome additions to our staff and will better enable us to meet our research commitment to screwworms.


J. Wendell Snow
Research Leader

cc: M. E. Meadows
H C Cox
E. A. Taylor

RECEIVED

OCT 21 1974

AREA OFFICE
WESLACO, TEXAS

SCREWWORM ERADICATION PROGRAM
P. O. Box 969
MISSION, TEXAS 78572
PHONE: (512) 585-1645
CONTACT: Don Nielson

74-51

East
well

STERILE FLY RELEASE BARRIER MOVES SOUTH OF U.S. BORDER

DOUGLAS, Ariz., Dec. 3..."The sterile screwworm fly release barrier has moved south of the United States border into Mexico's states of Sonora and Chihuahua since the onset of colder weather," reports Dr. J.E. Novy of the U. S. Department of Agriculture (USDA).

He is director of field operations for the Screwworm Eradication Program, administered by the Animal and Plant Health Inspection Service (APHIS). Larvae of the screwworm fly enter wounds in warm blooded animals to feed on live flesh.

Novy hastens to add: "Although the barrier program has moved south of the border, we are continuing to treat individual cases as they occur in Arizona and New Mexico. Particular emphasis is being given to southeast Arizona and southwest New Mexico and other protected areas where screwworms can survive and cases may occur this time of year.

Two cases of the parasite were confirmed in New Mexico during November, nine in Arizona, and six in California. This compares to five in New Mexico, 23 in Arizona, and eight in California during October.

The female screwworm fly mates only once in her lifetime. In the APHIS program, sterile but sexually active flies are released in a barrier along the northern edge of known screwworm populations and in the immediate vicinity of laboratory confirmed infestations. Any eggs the female fly produces as the result of mating with a sterile male will not hatch, ending the life cycle.

Novy notes "The Imperial Valley of southern California provides a winter climate which is definitely favorable for screwworm survival. We are releasing more than 2-million sterile flies per week to combat recent infestations there."

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DEC 4 1974

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20-30ABCD,21,31,46,51

STABLE FLY RELEASE PROGRAM

1982, 1983, and 1984. The stable fly release program has been conducted at the Texas State border (Stable fly release program) and at the Texas State border (Stable fly release program) and at the Texas State border (Stable fly release program).

This director of field operations for the Stable fly release program, is assisted by the Animal and Plant Health Inspection Service (APHIS). The director of the program is also assisted by the Texas State border (Stable fly release program) and at the Texas State border (Stable fly release program).

Key features of the program are: "Although the program has moved south of the border, we are continuing to treat individual cases as they occur in Arizona and New Mexico. Particular emphasis is being given to control of the program in Arizona and New Mexico and other protected areas where there can survive and cause any other type of pest."

The cases of the stable fly release program in New Mexico during 1982, 1983, and 1984. The cases of the stable fly release program in New Mexico during 1982, 1983, and 1984. The cases of the stable fly release program in New Mexico during 1982, 1983, and 1984.

The stable fly release program is a major effort to control the stable fly release program in New Mexico during 1982, 1983, and 1984. The stable fly release program is a major effort to control the stable fly release program in New Mexico during 1982, 1983, and 1984.

Key notes: The Imperial Valley of California provides a unique climate which is definitely favorable for stable fly release. We are releasing stable fly release in the Imperial Valley of California during 1982, 1983, and 1984.

SCREWWORM CASES

PERIOD: JANUARY THRU NOVEMBER 1974

TEXAS - 6836

Atascosa	44	Hardeman	1
Austin	1	Haskell	1
Bandera	58	Hays	20
Bastrop	5	Hidalgo	215
Bee	120	Hill	2
Bell	2	Howard	1
Bexar	27	Hudspeth	1
Blanco	16	Irion	68
Borden	1	Jackson	2
Brewster	83	Jeff Davis	18
Brooks	379	Jim Hogg	319
Brown	19	Jim Wells	98
Burleson	5	Johnson	2
Burnet	29	Karnes	23
Caldwell	10	Kendall	25
Calhoun	1	Kenedy	330
Callahan	1	Kent	2
Cameron	35	Kerr	40
Clay	1	Kimble	17
Coke	7	Kinney	254
Coleman	9	Kleberg	62
Colorado	2	Lampasas	1
Comal	19	La Salle	74
Comanche	18	Lavaca	5
Concho	22	Lee	29
Coryell	3	Limestone	1
Cottle	3	Live Oak	101
Crane	1	Llano	94
Crockett	379	McCulloch	13
Culberson	2	McMullen	11
DeWitt	70	Martin	1
Dimmit	113	Mason	28
Duval	148	Matagorda	3
Eastland	1	Maverick	32
Ector	2	Medina	160
Edwards	226	Menard	20
El Paso	14	Midland	5
Erath	1	Milam	6
Fayette	3	Mills	12
Fisher	4	Mitchell	10
Fort Bend	1	Montague	9
Frio	134	Motley	1
Gaines	2	Nolan	4
Gillespie	75	Nueces	8
Glasscock	14	Palo Pinto	1
Goliad	64	Parker	2
Gonzales	66	Parmer	1
Guadalupe	8	Pecos	115
Hamilton	3	Presidio	36

ARKANSAS - 2

Howard 2

CALIFORNIA - 42

Imperial 32
Riverside 4
San Diego 6

NEW MEXICO - 100

Catron 4
Chaves 1
Dona Ana 9
Eddy 9
Grant 31
Guadalupe 3
Hidalgo 13
Lea 2
Luna 7
Sierra 15
Socorro 2
Unknown 4

OKLAHOMA - 21

Beckham 1
Greer 4
Harmon 6
Jackson 1
Jefferson 6
Kiowa 1
Roger Mills 1
Tillman 1

ARIZONA - 183

Cochise 64
Gila 6
Graham 8
Greenlee 8
Maricopa 14
Mohave 4
Pima 20
Pinal 4
Santa Cruz 29
Yavapai 15
Yuma 11

SCREWWORM CASES - NOVEMBER 1974

TEXAS - 837

Atascosa	5
Bandera	4
Bee	5
Bexar	3
Brewster	5
Brooks	80
Brown	1
Burleson	2
Burnet	6
Caldwell	1
Calhoun	1
Cameron	8
Clay	1
Coke	1
Concho	1
Crockett	18
DeWitt	7
Dimmit	16
Duval	32
Edwards	29
Fayette	2
Frio	31
Gillespie	5
Glasscock	1
Goliad	4
Gonzales	4
Hays	1
Hidalgo	24
Irion	4
Jeff Davis	1
Jim Hogg	52
Jim Wells	19
Johnson	1
Karnes	2
Kendall	1
Kenedy	73
Kerr	3
Kimble	2
Kinney	40
Kleberg	23
La Salle	2
Lavaca	2
Lee	3
Limestone	1
Live Oak	5
Llano	5
McCulloch	1
Mason	2

Maverick	5
Medina	17
Menard	3
Montague	1
Nueces	3
Pecos	4
Presidio	7
Real	8
Reeves	3
Runnels	1
San Patricio	2
San Saba	1
Schleicher	4
Starr	21
Sterling	1
Sutton	17
Terrell	16
Tom Green	2
Travis	1
Uvalde	15
Val Verde	83
Victoria	1
Webb	13
Willacy	38
Wilson	1
Winkler	2
Zapata	5
Zavala	22

ARIZONA - 9

Cochise	2
Graham	1
Greenlee	1
Maricopa	2
Pinal	1
Santa Cruz	2

CALIFORNIA - 6

Imperial	6
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NEW MEXICO - 2

Eddy	1
Hidalgo	1

OKLAHOMA - 8

Beckham	1
Greer	1
Harmon	1
Jefferson	4
Kiowa	1

Bourdette (504) 527-6708
McDavid (202) 447-4026

*E A Taylor AD
Weslaco, Tex*

NEWS

U.S. DEPARTMENT OF AGRICULTURE

USDA-TEXAS TO STUDY SCREWORM ECOLOGY AND ATTRACTANTS:

COLLEGE STATION, Tex., Oct.15--The U. S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) has entered into a cooperative agreement with the Texas Agricultural Experiment Station to study screwworm ecology and attractants in south Texas and northern Mexico.

Screwworms constitute a severe economic pest of livestock in south Texas and northern Mexico resulting in losses amounting to millions of dollars annually.

ARS will furnish up to \$25,000 annually for the study which will run until the necessary information has been gathered.

There is a particular need for additional information on the general ecology of the screwworm fly plus an urgent need to develop an economical and effective attractant to assist USDA in its program to control or eradicate the screwworm from south Texas.

Dr. Frank Guillot will be principal investigator for the Texas Agricultural Experiment Station. Dr. J. Wendell Snow, of the ARS Screwworm Research Laboratory, Mission, Tex., is the sponoring scientist for ARS.

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OCT 29 1974

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